

# STATE OF CALIFORNIA

## Energy Resources Conservation And Development Commission

**DOCKET**

**08-AFC-13**

DATE OCT 25 2010

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In the Matter of:

The Application for Certification  
for the Calico Solar Power Project  
Licensing Case

Docket No. 08-AFC-13

**INTERVENOR BNSF's  
COMMENTS ON THE PMPD**

## **1. INTRODUCTION**

Intervenor Burlington Northern Railway Company ("BNSF") hereby submits its written comments on the Presiding Member's Proposed Decision ("PMPD") pursuant to the California Energy Commission Calico Solar AFC Committee's (the "CEC") Notice of Availability of the Presiding Member's Proposed Decision and Notice of Committee Conference and Notice of Full Commission Hearing of September 25, 2010 ("Notice of Availability of PMPD").

The CEC held evidentiary hearings on Applicant Calico Solar LLC's ("Applicant" or "Calico Solar") Application for Certification on August 4-6 in Barstow and on August 18 and 25 and September 20, 2010 in Sacramento. While Post-Hearing Briefs were required to be filed on or before August 23<sup>rd</sup>, three evidentiary hearings and two workshops were held after Post-Hearing Briefs were submitted. On September 3, 2010, after Post-hearing Briefs were submitted, the CEC Committee overseeing Calico Solar's Application for Certification issued an Order Directing Further Review of Reduced Footprint Alternatives ("Reduced Footprint Alternatives Order"). According to the Footprint Alternatives Order, "[t]he Committee can not recommend approval of the Calico Solar project as proposed by the Applicant due to the scope and scale of high quality habitat affecting desert tortoises and bighorn sheep that would be lost in order to construct and operate the project." Consequently, Calico Solar proposed several reduced

footprint alternatives. The current revised proposed Project by the Applicant is referred to as Alternative 5.5. Alternative 5.5 reduces the acreage of the proposed Project to a 4,613 acre site with an electrical generation capacity of 663.5-MW and eliminates critical project elements intended to address significant environmental impacts.

On September 17, 2010, Staff issued one of several addenda to the SSA, purporting to analyze Applicant's proposed Alternative 5.5. Intervenors were required to submit comments simultaneously. The following Monday, September 20, 2010, the CEC held yet another evidentiary hearing – this time focused on Alternative 5.5. That hearing began at 1pm and, over Intervenors' objections, continued to 4:30 am the following morning. On September 25, 2010, the Siting Committee issued the PMPD.

The Siting Committee scheduled a non-evidentiary hearing for October 22<sup>nd</sup> and then again for October 26<sup>th</sup> – the day after comments on the PMPD are due. The full Commission has set a hearing to consider the PMPD on October 28, 2010.

BNSF has significant environmental, safety, and operational issues relating to the Calico Solar Project concerning the direct effects on the existing use of its property and interference with the safe use of its transcontinental mainline, which have not been addressed in this proceeding. Those critical issues have been detailed through BNSF's submissions, to include but not limited to its Post-

Hearing Brief, written testimony and exhibits submitted during the proceedings, oral testimony of expert witnesses during the evidentiary hearings, cross examination of Applicant and Staff witnesses and experts during the evidentiary hearings, stipulations entered by and between BNSF and Applicant entered on the Record, and other evidence presented at evidentiary hearings. Many of BNSF's concerns overlap and are consistent with those of other intervenors including CURE and Sierra Club and the general public. BNSF hereby incorporates by reference the comments and criticisms raised by Intervenors CURE and the Sierra Club. The issues of concern to BNSF that have been detailed in the Record have not been adequately addressed in the PMPD. To date, there have been no site specific studies that analyze the impact of the proposed project on BNSF rail operations with the purpose of ensuring that the proposed project will not interfere with BNSF's rail operations or Right-of-Way ("RoW"). Based on the Record to date, this is simply the wrong project at the wrong location, and may constitute a nuisance. Accordingly, BNSF opposes certification.

## **2. BRIEF HISTORY OF BNSF OPERATIONS**

BNSF is one of two Class 1 railroads operating in California. BNSF's transcontinental mainline, traversed by as many as 80 trains per day, carries interstate commerce from the Ports of Los Angeles and Long Beach to U.S. Midwestern, Southwestern and Eastern markets. BNSF's mainline has operated through the section of the Mojave Desert, where Calico Solar has now proposed its



Project, for over one hundred years. Approximately 40percent of all of the nation's west coast imports and exports transit the BNSF mainline in California. The proposed Project, comprised of 26,540 solar dishes (SunCatchers), transmission line upgrades, detention basins, etc., would surround both sides of approximately 5 miles of BNSF's mainline tracks. The mainline through the section where the proposed Project plans on emplacing 26,540 SunCatchers has two at-grade crossings, a significant curve, changes elevations, requires engineers to adjust speed through curves and elevation changes, and has six signals that critical safety features on which the engineers rely to ensure that they do not collide with other trains moving through the section.<sup>1</sup>

Accordingly, BNSF has significant and legitimate concerns that the construction and operation of the Project do not adversely impact BNSF operations or otherwise impose unacceptable safety risks to BNSF personnel and operations. An adverse impact to rail traffic by the Project construction or operations could have a devastating impact on interstate commerce and portions of this nation's economy. BNSF carries transcontinental shipments of, *inter alia* coal, grains, and merchandise for everything from UPS to major retailers. BNSF trains currently run approximately every fifteen minutes in both directions and extend for over a mile in length. Because of the critical nature of the role of BNSF's

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<sup>1</sup> Exhibits 1203 (Prepared testimony of Joseph Schnell), 1204 (Prepared Testimony of Dennis Skeels), 1206 (Prepared Testimony of Edward Phillips); Exhibit 3 to Exhibit 1203 (Track Chart); testimony of Joseph Schnell ("Schnell"), Transcript of August 18, 2010 ("8/18/2010 TR") at 94:2-95:2.

mainline in interstate commerce, BNSF must continue to maintain complete and unimpeded access to and use of its RoW and sole and independent discretion to ensure that its rail operations are safe and efficient.<sup>2</sup> In addition, as a transcontinental railroad impacting interstate commerce, BSNF is subject to federal regulations and oversight.<sup>3</sup>

### 3. **STANDARD OF REVIEW**

The Calico Solar Project and its related facilities are subject to the CEC's licensing jurisdiction. Cal. Pub. Res. Code §§25500, *et seq.* During licensing proceedings, the CEC acts as lead state agency under the California Environmental Quality Act ("CEQA"). Cal. Pub. Res. Code §§25519(c), 21000 *et seq.* The CEC's regulatory process, to include the evidentiary record (the "Record") and Staff Assessment, is the functional equivalent of an Environmental Impact Report. Cal. Pub. Res. Code §21080.5. Accordingly, the CEC must comply with CEQA and the CEC's underlying regulatory scheme and the certification process and decision are subject to judicial review. See Cal. Pub. Res. Code §25531.

Public review and comment are integral requirements under CEQA. CEQA is designed to inform decision makers and the public about significant environmental impacts from a proposed project *before harm is done to the environment.* *Berkeley Keep Jets Over the Bay v. Bd. of Port Comm'rs*, 91

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<sup>2</sup> Exhibits 1203, 1204, 1206; Schnell testimony, 8/18/2010 at 95:3.

<sup>3</sup> Exhibits 1203, 1204, Schnell testimony, 8/18/2010 TR at 96:21-97:19.

Cal.App. 4<sup>th</sup> 1344, 1354 (2001); *County of Inyo v. Yorty*, 32 Cal.App. 3d 795, 810 (1973). Specifically, the Commission must prepare a draft assessment, provide a public comment period, review comments it receives to its draft assessment, and *provide a written response to the comments it received*. Cal.Pub.Res. Code §§21091(d); 21091(a); 21092. The prescribed public comment period is thirty (30) days. Cal.Pub.Res. Code §§21091(a); 21092. The Commission cannot avoid this critical CEQA requirement by issuing errata or addenda where the subject matter being assessed is new information. To do so would violate CEQA's requirement that the agency allow "critical evaluation that occurs in the draft stage" that is designed to allow the public and intervenors to "test, assess, and evaluate the data and make an informed judgment as to the validity of the conclusions to be drawn therefrom." *Sutter Sensible Planning, Inc. v. Board of Supervisors*, 122 Cal.App. 3d 813, 822 (1981). Moreover, under the Warren Alquist Act, the Commission is required to hold public hearings at times and places designed to "provide a reasonable opportunity for the public and all parties to comment upon the application and the commission staff assessment." Cal.Pub.Res. Code §25521.

CEQA is not, however, simply a "notice to the public" statute. Rather, it requires public agencies to undertake a good faith analysis and not simply create a paper trail to support its predetermination to approve a particular project. *City of Santee v. County of San Diego*, 186 Cal.App. 4<sup>th</sup> 55, 62 (2010) ("The full

consideration of environmental effects CEQA mandates must not be reduced 'to a process whose result will be largely to generate paper, to produce an EIR that describes a journey whose destination is already predetermined.'" (citing *Save Tara v. City of West Hollywood*, 45 Cal.4<sup>th</sup> 116, 134 (2008)). CEQA directs public agencies to avoid or reduce environmental damage and requires the implementation of mitigation measures to reduce the impact to less than significant or make a specific finding that the damage is not mitigable but the benefit from the project outweighs the damage it will cause. *Laurel Heights Improvement Ass'n v. Regents of the University of California*, 47 Cal. 3d 376, 400 (1988) (The purpose of environmental review is to "alert the public and its responsible officials to environmental changes before they have reached ecological points of no return..., to demonstrate to an apprehensive citizenry that the agency has, in fact, analyzed and considered the ecological implications of its action... Because the EIR must be certified or rejected by public officials, it is a document of accountability. If CEQA is scrupulously followed, the public will know the basis on which its responsible officials either approve or reject environmentally significant action, and the public, being duly informed, can respond accordingly to action with which it disagrees.... The EIR process protects not only the environment but also informed self-government." (citations omitted) Final EIR for university's relocation of its biomedical research facilities to a newly acquired building in a residential area overturned for failure to address anticipated

future use of the new building and the related environmental effects, and for inadequate discussion of project alternatives.).

A primary requirement of an EIR is that it consistently, accurately and completely describe the project. “An accurate, stable and finite project description is the *sine qua non* of an informative and legally sufficient EIR.” *County of Inyo v. City of Los Angeles* (3d Dist. 1977) 71 Cal.App.3d 185, 193. “Only through an accurate view of the project may affected outsiders and public decision-makers balance the proposal’s benefit against its environmental cost, consider mitigation measures, assess the advantage of ... the ‘no project’ alternative ... and weigh other alternatives in the balance.” *Id.* at 192-193. In addition, CEQA proscribes “piecemealing” of projects. Environmental concerns cannot be hidden by chopping a large project into numerous little ones, each having a small impact on the environment but cumulatively having a larger impact. *City of Santee v. County of San Diego*, 214 Cal.App. 3d 1438, 1452 (1989).

In addition to a bar on deferred analysis and mitigation, CEQA proscribes “piecemealing” of projects. Environmental concerns cannot be hidden by chopping a large project into numerous little ones, each having a small impact on the environment but cumulatively having a larger impact. *City of Santee v. County of San Diego*, 214 Cal.App. 3d 1438, 1452 (1989).

The Commission may not certify a project unless it specifically finds that: (1) changes or alterations in the project have been incorporated which will "mitigate or avoid" any significant effects on the environment; or (2) mitigation measures or alternatives are not feasible and there are specific, clearly articulated overriding benefits of the project which outweigh the significant environmental impact that will necessarily result if the project is certified. Cal.Pub.Res. Code § 21081; 20 Cal.Code Regs. § 1755. These findings must be supported by substantial evidence in the record. Cal.Pub.Res. Code § 21081.5; 14 Cal.Code Regs. §§ 15091(b), 15093; *Sierra Club v. Contra Costa County*, 10 Cal.App. 4<sup>th</sup> 1212, 1222-23 (1992).

An approval will be set aside if the agency approves a project without first making a proper determination of whether there are feasible mitigation measures available which will avoid or substantially lessen significant environmental effects, as required by CEQA. *Sierra Club v. State Board of Forestry* (1994) 7 Cal. 4th 1215, 1236-37 (Forestry board failed to fulfill obligation imposed by CEQA to collect information regarding the presence of old-growth-dependent species on the site of a proposed timber harvest. Without that information the board could not identify the environmental impacts of the project or carry out its obligations under CEQA or the certified regulatory program.). An agency that adopts mitigation measures has the burden of establishing, through substantial evidence, that the mitigation measures are clearly defined, feasible, effective, and

capable of implementation. *Federation of Hillside and Canyon Associations v. City of Los Angeles*, 83 Cal.App. 4<sup>th</sup> 1259, 1262 (2000).

Under CEQA, the Commission is not permitted to defer the requisite studies necessary to assess environmental impacts and ascertain whether mitigation measures are feasible. Specific mitigation details may be deferred, but only in limited circumstances. *San Joaquin Raptor Rescue Center v. County of Merced*, 149 Cal.App. 4<sup>th</sup> 645, 670-671 (2007). Deferral of specific mitigation measures is only permissible where the Commission has: (1) undertaken a thorough and complete analysis; (2) proposed potential mitigation measures early on in the certification process; and (3) articulated specific performance criteria in its Conditions of Certification that will ensure that appropriate and adequate mitigation measures will be implemented to bring the impact to less than significant. *San Joaquin Raptor Rescue Center*, 149 Cal.App. 4<sup>th</sup> at 670-671; *Communities for a Better Environment v. City of Richmond*, 184 Cal.App. 4<sup>th</sup> 70 (2010).

The Commission must comply with all federal laws, ordinances, regulations, and standards. Cal.Code Regs. 1714.3(b), 1714.5(b), 1721, 1741, 1744. Federal preemption is well established and CEQA projects must comply with all applicable federal laws, regulations and standards. *U.S.C.A. Const. Art. 6, cl. 2*; *Hillsborough County v. Automated Medical Labs*, 471 U.S. 707, 712 ; *see also National Ass'n of Regulatory Util. Commissioners v. Coleman*, 399 F.Supp.

1275 (1975) (court upheld FRA regulation preempting states from prescribing a railroad accident reporting requirement); *Gauthier v. Union Pacific R.R. Co.*, 644 F.Supp.2d 824 (2009) (preemption of state negligence claim by Federal Railroad Safety Act; "The Federal Railroad Safety Act (FSRA) was enacted in 1970 to promote safety in every area of railroad operations and to reduce railroad-related accidents and incidents. 49 U.S.C. § 20101."); *CSX Transportation v. Easterwood*, 507 U.S. 658 (1993) (Regulations adopted by the Secretary of Transportation under the Federal Railroad Safety Act, regarding warning requirements at rail crossings and regarding maximum train speeds on certain types of tracks, preempted any contrary requirements under state law); U. S. Const., Art. I, Sec. 8, Cl. 3 (Commerce Clause); Interstate Commerce Commission Termination Act, 49 U.S.C. §§ 701 *et seq.*; Federal Railway Administration Regulations, Title 49 of the Code of Federal Regulations; General Code of Operating Rules (effective April 7, 2010).

The CEC's evidentiary hearings on the application are used to identify significant adverse impacts of the proposal on the environment and shall assess the feasibility of measures to mitigate the adverse impacts. 20 CCR 1748(a). The hearings shall consider whether the facilities can be constructed and operated safely and shall assess the need for and feasibility of modification to assure safe and reliable operation. 20 CCR 1748(b). The hearings shall also consider whether the facility can be constructed and operated in compliance with applicable federal,



state and local laws ordinances, regulations and statutes ("LORS"). 20 CCR 1748(c).

During the entire process, to include the evidentiary hearings, the Applicant has the burden of presenting substantial evidence to support the findings and conclusions required for certification. 20 CCR 1748(d). Substantial evidence does not include argument, speculation, unsubstantiated opinion or narrative, or evidence that is clearly inaccurate or erroneous. Cal. Pub. Res. Code §§21080(e), 21082.2(c). The Presiding Member's Proposed Decision ("PMPD") shall be based exclusively on the hearing record, including the evidentiary record, and shall contain reasons supporting the decision and reference to the bases for each of the findings and conclusions. 20 CCR 1751.

**4. THE PMPD IS NOT CEQA COMPLIANT**

**A. Insufficient Notice and Opportunity to Comment/Predetermination**

The Record in this matter clearly reflects that the Commission did not provide the requisite 30-day notice and comment period. Staff assessments containing new information were routinely provided to the public and intervenors with statutorily insufficient time to review and comment. Indeed, in some instances intervenors were required to comment on Applicant's new proposals at the same time Staff provided comments. Moreover, insufficient time was accorded for evidentiary hearings and the Commission forced all participants to

engage in hearings well into the night and into the early morning hours. The CEC process complied with neither CEQA nor the Warren Alquist Act.

The Record in this matter likewise clearly reflects that there is only one reason for abrogating the public's and intervenors statutorily prescribed notice and comment period, compressing the certification process in such an unreasonable and unrealistic manner, and failing to perform critical pre-certification studies – the Applicant's desire to begin construction before the end of the year to qualify for one, among others, American Recovery and Reinvestment Act ("ARRA") program. ARRA, however, does not eliminate the clear notice and comment requirements under CEQA and the Commission's own regulations.

The Staff Assessment/Draft Environmental Impact Statement ("SA/DEIS"), which was the first environmental staff assessment prepared and published for comment by the Staff, identifies ARRA on page A-1. Throughout the SA/DEIS, ARRA is referenced and Staff notes that Applicant "must begin construction by the end of the year" in order to qualify for ARRA funding. [SA/DEIS, Biological Resources, C.2-1, C.2-157.]

According to Commissioner Byron, "these projects have a very aggressive schedule for the permitting process because there is a great deal of potential funds available to this state from the American Recovery/Reinvestment Act." [8/5/2010 Transcript ("TR") at 25:22-25. Ashleigh Blackford testified from U.S. Fish &

Wildlife Service and acknowledged that "we have not had enough time with the ARRA funding deadline to, you know, pursue getting that information, . . ."

8/25/2010 TR at 120:12-17. Without question, the Commission abrogated the public's and intervenors' rights to the statutorily required time with which to review and comment on staff assessments. As Ms. Blackford conceded, "if we had started two years ago and we didn't have ARRA pushing us, . . ." the Commission would never have established such an unreasonable schedule – including requiring two evidentiary hearings to extend well past midnight.

[Testimony of A. Blackford at 8/25/2010 TR at 128:12-15.]

Accordingly, it was apparent from day one of the evidentiary hearings that the project – in one form or another – was going to be certified. Such predetermination and abrogation of statutorily prescribed notice and comment periods are violations of CEQA and the Commission's own regulations.

B. Impermissible Deferred Mitigation

To date, there has been no site specific glare and glint study that addresses the effects of the project on BNSF's rail operations. On August 9, 2010, Staff issued a Supplemental Staff Assessment that found that "SunCatcher Mirrors have the potential to significantly affect train crews . . ."

[Supplemental Staff Assessment, August 9, 2010, at C.11-15.] Nothing has changed. BNSF's proposed Condition of Certification was not adopted and the PMPD rejects

BNSF's request that such a study be performed. The CEC failed to perform the necessary site-specific study to determine if mitigation to fully address significant adverse impacts on rail operations is feasible, and neither the law nor the evidence supports the proposed Conditions of Certification or that the impact is mitigated to less than significant. Without question, a very real harm has been identified. Not only is there an unmitigated impact to visual vistas, there is no question that there is a danger to human health. Applicant submitted absolutely no evidence on this issue. Indeed, its sole tendered exhibit – an unrelated study from a different site – was properly excluded by the Committee.

Without first ascertaining the risk of harm to rail operations and train crews (not only from an individual SunCatcher, but from the cumulative impact of an array of thousands of SunCatchers), and determining whether there are feasible mitigation measures that can decrease that impact to less than significant – the PMPD proposes to defer a determination of feasibility through a Condition of Certification. This is a clear violation of CEQA and the Commission's own regulations.

Likewise, the PMPD sets forth a plethora of Conditions of Certification in Soil and Water Resources<sup>4</sup> in a veiled attempt to mask the fact that neither the Applicant nor the Staff have performed essential hydrology studies in support of

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<sup>4</sup> During the October 22, 2010 PMPD Hearing, the Commission requested BNSF to forward its proposed redline changes to Soil & Water Conditions of Certification and Civil-1 to docketing and the service list. BNSF did so before 1pm that same date.

the project proposed, Alternative 5.5. Without question, the proposed project and every construction alternative analyzed by Staff from the SA\DEIS up through September 17<sup>th</sup> required a series of detention and debris basins. These essential project features – which entailed 600 acres of the project site – were necessary to ensure that the impact of a 100-year flood on the project site and adjacent properties could be mitigated to less than significant.

The Commission rejected Applicant's proposed project because it resulted in unmitigable impacts to a large area of critical environmental habitat. In response, Applicant proposed to reduce the footprint of the project site by approximately 1600 acres. To maximize its remaining acreage on which it could emplace SunCatchers and concomitantly minimize the loss of MegaWatt generation capacity, Applicant simply proposed to eliminate all debris and detention basins. The sole basis for this proposal is the Chang Report – which is a sedimentation study that fails even to address a 100-year flood, and which Staff dismissed as "insufficient." This is a clear violation of CEQA and the Commission's own regulations.

### C. Federal Preemption

BNSF has provided the Commission with expert testimony regarding and has specifically referenced a variety of federal laws, regulations and standards ("Federal LORS") that apply to rail operations and by which BNSF is governed.

The PMPD sets forth mitigation measures in the form of Conditions of Certification which impermissibly conflict with federal laws. The PMPD also omits reference to those Federal LORS which apply to the railroad. This is a clear violation of CEQA and the Commission's own regulations.

D. Inaccurate, Incomplete and Unstable Project Description

The CEC has failed to adequately describe the project, as required by CEQA. As stated above, “[a]n accurate, stable and finite project description is the sine qua non of an informative and legally sufficient EIR.” *County of Inyo, supra*, 71 Cal.App.3d 185, 193. As the record indicates, the Calico project description has been continuously revised throughout the CEC process. Revisions have been submitted by the Applicant and accepted by the CEC for hearing without regard to CEQA’s requirements for notice and opportunity to comment. The ever-changing nature of the project description has made it impossible for interested parties to have the necessary “accurate view” of the project to provide meaningful comments. *Id.* at 192. The short timeframes provided between project revisions and the related hearings have made interested parties unable to adequately review and analyze project revisions, and “to balance the proposal’s benefit against its environmental cost, consider mitigation measures, assess the advantage of ... the ‘no project’ alternative ... and weigh other alternatives in the balance.” *Id.* at 192-193.

E. Impermissible "Piecemealing" of Project

In addition to improperly failing to analyze the additional transmission lines and Pisgah Substation expansion (see CURE's Comments on the PMPD at pp. 4-8), the PMPD fails to analyze the potential impact of Applicant's stated intent to make up its lost MegaWatt capacity in additional projects. At present, the current proposal could deliver a maximum capacity of 663.5 MW, assuming no debris basins, detention basins, or other flood control measures are incorporated into the project site, and/or portions of the site are not found to be inappropriate for the placement of SunCatchers as a result of other studies which have not been performed or were performed inadequately. Accordingly, there is currently no way to reasonably ascertain the ultimate MegaWatt capacity of the project because the proper hydrology, glare and glint, and other studies have not been performed. These studies will dictate the specific placement of debris basins, detention basins, and other flood control measures, SunCatchers and related other project features. Moreover, Applicant has repeatedly stated its intent to some how make up the lost MegaWatt capacity from the original 850MW project proposal. Applicant has stated that this is necessary to maximize ARRA funding and to ensure that it does not lose its performance bond. Applicant has stated that it intends to do so through other projects, some of which may be located on lands adjacent to the ultimately approved project site. This is a clear violation of CEQA and the Commission's own regulations.

5. **CONCLUSION**

For all the foregoing reasons, BNSF respectfully requests that the Commission reject the PMPD.

October 25, 2010

*Cynthia Lea Burch*

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## **ATTACHMENTS**

A	Exhibit 1200
B	Exhibit 1201
C	Exhibit 1202
D	Exhibit 1203
E	Exhibit 1204
F	Exhibit 1205
G	Exhibit 1206
H	Exhibit 1207
I	Exhibit 1208
J	Exhibit 1209
K	Exhibit 1210
L	Exhibit 1211
M	Exhibit 1212
N	Exhibit 1213
O	Exhibit 1214
P	BNSF Post-Hearing Brief
Q	BNSF Comments and Protests to FEIS
R	BNSF Supplemental Comments and Protests to FEIS
S	Sierra Club's PMPD Comments
T	CURE's PMPD Comments



**BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT  
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**APPLICATION FOR CERTIFICATION**

***For the CALICO SOLAR (Formerly SES Solar One)***

**Docket No. 08-AFC-13**

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(Revised 8/9/10)**

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### DECLARATION OF SERVICE

I, Ani Seferyan, declare that on October 25, 2010, I served and filed copies of the attached Intervenor BNSF's Comments on the PMPD, dated October 25, 2010. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [[www.energy.ca.gov/sitingcases/solarone](http://www.energy.ca.gov/sitingcases/solarone)].

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**AND**

#### FOR FILING WITH THE ENERGY COMMISSION:

- ☒ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (*preferred method*);

**OR**

- ☐ depositing in the mail an original and 12 paper copies, as follows:

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I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

/s/ Ani Seferyan

**Ani Seferyan**

# **STATE OF CALIFORNIA**

## **Energy Resources Conservation And Development Commission**

In the Matter of:  
The Application for Certification  
for the Calico Solar Power Project  
Licensing Case

Docket No. 08-AFC-13

### **INTERVENOR BNSF's COMMENTS ON THE PMPD**

## ATTACHMENTS

A	Exhibit 1200
B	Exhibit 1201
C	Exhibit 1202
D	Exhibit 1203
E	Exhibit 1204
F	Exhibit 1205
G	Exhibit 1206
H	Exhibit 1207
I	Exhibit 1208
J	Exhibit 1209
K	Exhibit 1210
L	Exhibit 1211
M	Exhibit 1212
N	Exhibit 1213
O	Exhibit 1214
P	BNSF Post-Hearing Brief
Q	BNSF Comments and Protests to FEIS
R	BNSF Supplemental Comments and Protests to FEIS
S	Sierra Club's PMPD Comments
T	CURE's PMPD Comments

# **STATE OF CALIFORNIA**

## **Energy Resources Conservation And Development Commission**

In the Matter of:  
The Application for Certification  
for the Calico Solar Power Project  
Licensing Case

Docket No. 08-AFC-13

### **PREPARED DIRECT TESTIMONY OF DENNIS SKEELS BNSF RAILWAY COMPANY**

July 29, 2010

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PREPARED DIRECT TESTIMONY

OF

Dennis Skeels

Manager Signals California Division – BNSF

Q.1 Please state your name and occupation?

A.1 My name is Dennis Skeels. I am the Manager Signals, California Division, for BNSF Railway Company ("BNSF"). My resume is attached to this testimony.

Q.2 What is the purpose of your testimony in this proceeding?

A.2 I will testify on two areas of concern to BNSF:

- (1) transmission line safety and nuisance (induction); and
- (2) transportation (glint and glare).

Q.3 Why does BNSF have concerns regarding the Calico Solar Project?

A.3 BNSF is one of two Class 1 railroads operating in California. BNSF's mainline, which is traversed by as many as 80 trains per day, carries interstate commerce from the Ports of Los Angeles and Long Beach to U.S. Midwestern, Southwestern and Eastern markets. The proposed Project would surround both sides of several miles of BNSF's mainline tracks. Accordingly, BNSF has significant concerns that the construction and operation of the Project do not adversely impact BNSF operations or otherwise impose unacceptable safety risks to BNSF personnel and operations.



The consummation of the Project would require the granting of several licenses and permits from BNSF, which Applicant Calico Solar ("Calico Solar") has requested in a piecemeal fashion over the course of the past year. To date, none of these requested licenses or permits have been granted. Before BNSF can grant such licenses and permits, BNSF must be assured that its significant safety and operational concerns are addressed.

Q.4 What are BNSF's safety and operational concerns in relation to transmission line safety and nuisance (induction)?

A.4 First, I want to note that there are no site specific drawings or diagrams that identify precisely where Calico Solar plans on emplacing transmission lines. Accordingly, BNSF is concerned that the proposed proximity of the transmission line to BNSF's mainline may result in electrical induction on the rail. Electrical induction is a significant safety issue. In addition to the potential to cause significant health risks, to include death, electrical induction has the potential to significantly adversely impact rail operations. The proposed Project would include approximately 1.9 miles of new transmission line immediately adjacent to BNSF's mainline.

Q.5 Does BNSF have any prior experience regarding electrical induction problems?

A.5 Yes, we have. BNSF has experienced interference with signals, equipment malfunction, and employees being shocked in similar situations in other locations, and is concerned that the proposed configuration of these Project elements may raise a safety issue.

Q.6 Have you had the opportunity to review site specific studies addressing BNSF's concerns in relation to transmission lines and electrical induction at the Project?

A.6 No. I am not aware of any such site specific studies that address rail operations and safety issues.

Q.7 Given the absence of site specific studies, is there a Condition of Certification that would provide BNSF with comfort relating to potential induction issues caused by the emplacement of Calico Solar's transmission lines?

A.8 Yes. In the absence of any studies addressing induction issues which may be caused by the Project, BNSF has taken a conservative position, based on experience, with respect to the necessary setback of the transmission line to avoid any induction issues. BNSF believes that a 300' setback from the right of way should be maintained.

Q.9 Has Calico Solar agreed to a 300' setback?

A.9 Yes. Calico Solar has agreed to set back the proposed transmission line 300' from the BNSF right of way.

Q.10 Why does the setback need to be measured from the BNSF right of way, rather than from the actual emplacement of the rail line?

A.10 Because BNSF owns and operates within the entire right of way and must preserve its right to emplace additional lines throughout the right of way to meet demand, operational, and safety concerns in the future.

Q.11 Are there any other Conditions of Certification necessary in relation to transmission lines?

A.11 Yes. In addition, per BNSF requirements, in the location where the transmission line is proposed to cross the tracks, Calico Solar's transmission lines must cross the BNSF mainline at a 90-degree angle, and travel 300' from the far side of the right of way before returning to a parallel configuration. This is necessary to avoid electrical induction of the rail line, which is a critical safety requirement.

Q.12 What are BNSF's safety and operational concerns in relation to transportation (glint and glare)?

A.12 BNSF's mainline, along which the Project is proposed to be built, is curved. An essential signal for rail traffic is located in the vicinity near Hector Road. Signals are critical safety features. Calico Solar's Project certification application seeks authority to emplace up to 34,000 SunCatchers within a 6,215 acre tract that falls on both sides of BNSF's right of way.

While there are no drawings or diagrams that specify precisely where the SunCatchers will be emplaced, Calico Solar proposes to locate the nearest SunCatchers as close as 100' from the BNSF right of way, on both sides of the transcontinental mainline track, for approximately five miles.

Q.13 Why does the emplacement of the SunCatchers cause operational and safety concerns for BNSF?

A.13 Because daytime glint and glare from the 34,000 SunCatcher mirrors and associated structures, in particular when the mirrors are in offset tracking position, may significantly impact BNSF engineers' ability to see the signal. The situation would be exacerbated by the site elevations which Calico Solar has proposed.

Q.14 In addition to the safety concerns, are there federal regulations that govern signals?

A.14 Yes. BNSF is required by federal regulations to maintain visual contact with signals. If a train's contact with a signal is lost and cannot be regained, the engineer is required to stop the train. This often requires an emergency application of the brakes, risking derailment of the train. When a train has been stopped through emergency application of the brakes, BNSF General Code of Operating Rule 6.23 requires the engineer to inspect all cars, units, equipment and track pursuant to BNSF special instructions and rules. This can cause significant delays to rail operations with ramifications reaching from the Ports of Los Angeles and Long Beach to Chicago and beyond.

Q.15 Have you had an opportunity to review site specific studies relating to the potential impact to rail operations of glint and glare from the SunCatchers?

A. No. It appears that the Commission and Calico Solar have both considered potential impacts to motorists along I40 and I15. In that regard, there seems to be agreement that a Condition of Certification will be that any SunCatcher will be offset at least 360' from I40 or I15.

Q.16 Would a similar offset from the right of way address BNSF's concerns?

A.16. No. The limited studies available relate to motor vehicle traffic assume certain heights, elevations, and angles for both the SunCatchers and affected motorists. The heights, elevations, and angles relating to an engineer traveling along the curved track are not the same as those for the affected motorists. Thus, glint and glare are critical safety and operational issues for BNSF. While the SA/DEIS has begun to address glint and glare with respect to motorists on nearby roadways (SA/DEIS pp. C.13-13 – C.13-22), and BNSF understands that a Glint and Glare Study is currently being performed, neither currently addresses potential glare impacts to rail, nor are these studies specific to the Project site. In addition, the SSA Transportation section has not yet been released, and BNSF is therefore unable to make meaningful comments on the potential Glint and Glare analysis at this time.

Q.17 Based on these stated concerns, what is BNSF's proposal in relation to the glare and glint issue?

A.17 BNSF requests that the following Condition of Certification be incorporated into the Project:

Prior to the first SunCatcher disc being mounted on a pedestal, a site-specific Glare/Glint study shall be performed to address the Glare /Glint issues raised by BNSF with respect to the potential impact of the proposed Calico Solar SunCatchers on BNSF rail operations and the recommended mitigation measures, once approved by BNSF, shall be implemented by Calico Solar at its expense. The site specific study shall commence immediately upon BNSF's selection of the experts to perform the study. In the event the CEC's on-going Glare/Glint study resolves BNSF's Glare/Glint issues to BNSF's satisfaction, BNSF will advise the CEC and Calico Solar and the CEC site-specific Glare/Glint study and the implementation of its mitigation measures shall be deemed compliance with the above Condition of Approval.

Q.18 Has BNSF had discussions regarding BNSF's concerns with Calico Solar?

A.18 Yes, BNSF has had had several discussions, to include a face-to-face meeting. It is my understanding that Calico Solar supports BNSF's request for a Condition of Certification.

Q.19 Does this complete your direct testimony?

A.19 Yes, it does.

I swear under penalty of perjury that this testimony is true and correct to the best of my knowledge and belief.

Dated: July 29, 2010

Dennis Skeels

Dennis Skeels

Manager Signals

**Dennis Skeels**

**Curriculum Vitae**

As Manager of Signals for BNSF Railway Company California Division, Mr. Skeels is responsible for the installation, testing and maintenance of all signal apparatus in the state of California. His responsibilities include but are not limited to management of BNSF crossings, signals, detectors, power switches, electric locks and more.

(to be supplemented)





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**APPLICATION FOR CERTIFICATION**

*For the CALICO SOLAR (Formerly SES Solar One)*

**Docket No. 08-AFC-13**

**PROOF OF SERVICE**  
*(Revised 7/12/10)*

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**DECLARATION OF SERVICE**

I, HARRIET VLETAS, declare that on July 30, 2010, I served and filed copies of the attached Prepared Testimony of Dennis Skeels, dated July 29, 2010. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [\[www.energy.ca.gov/sitingcases/solarone\]](http://www.energy.ca.gov/sitingcases/solarone).

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I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.



Harriet Vletas



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**APPLICATION FOR CERTIFICATION**

***For the CALICO SOLAR (Formerly SES Solar One)***

**Docket No. 08-AFC-13**

**PROOF OF SERVICE  
(Revised 8/9/10)**

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### DECLARATION OF SERVICE

I, Ani Seferyan, declare that on October 25, 2010, I served and filed copies of the attached "Attachment A - Exhibit 1200" dated October 25, 2010. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [\[www.energy.ca.gov/sitingcases/solarone\]](http://www.energy.ca.gov/sitingcases/solarone).

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- ☐ depositing in the mail an original and 12 paper copies, as follows:

#### **CALIFORNIA ENERGY COMMISSION**

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1516 Ninth Street, MS-4  
Sacramento, CA 95814-5512  
[docket@energy.state.ca.us](mailto:docket@energy.state.ca.us)

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

\_\_\_\_\_  
/s/ Ani Seferyan  
Ani Seferyan

# **STATE OF CALIFORNIA**

## **Energy Resources Conservation And Development Commission**

In the Matter of:  
The Application for Certification  
for the Calico Solar Power Project  
Licensing Case

Docket No. 08-AFC-13

### **INTERVENOR BNSF's COMMENTS ON THE PMPD**

## ATTACHMENTS

A	Exhibit 1200
B	Exhibit 1201
C	Exhibit 1202
D	Exhibit 1203
E	Exhibit 1204
F	Exhibit 1205
G	Exhibit 1206
H	Exhibit 1207
I	Exhibit 1208
J	Exhibit 1209
K	Exhibit 1210
L	Exhibit 1211
M	Exhibit 1212
N	Exhibit 1213
O	Exhibit 1214
P	BNSF Post-Hearing Brief
Q	BNSF Comments and Protests to FEIS
R	BNSF Supplemental Comments and Protests to FEIS
S	Sierra Club's PMPD Comments
T	CURE's PMPD Comments

# **STATE OF CALIFORNIA**

## **Energy Resources Conservation And Development Commission**

In the Matter of:  
The Application for Certification  
for the Calico Solar Power Project  
Licensing Case

Docket No. 08-AFC-13

### **PREPARED DIRECT TESTIMONY OF EDWARD P. PHILLIPS BNSF RAILWAY COMPANY**

July 29, 2010

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Attorneys for Intervenor  
BNSF Railway Company



PREPARED DIRECT TESTIMONY

OF

Edward P. Phillips

Manager Environmental Operations – California Division, BNSF

Q.1 Please state your name and occupation?

A.1 My name is Edward P. Phillips. I am the Manager of Environmental Operations for the California Division of BNSF Railway Company ("BNSF"). I am based in San Bernardino, California. My resume is attached to this testimony.

Q.2 What is the purpose of your testimony in this proceeding?

A.2 I will testify on two areas of concern to BNSF:

- (1) hazardous materials management (hydrogen); and
- (2) biological resources (desert tortoise).

Q.3 Why does BNSF have concerns regarding the Calico Solar Project?

A.3 BNSF is one of two Class 1 railroads operating in California. BNSF's mainline, which is traversed by as many as 80 trains per day, carries interstate commerce from the Ports of Los Angeles and Long Beach to U.S. Midwestern, Southwestern and Eastern markets. The proposed Project would surround both sides of several miles of BNSF's mainline tracks. Accordingly, BNSF has significant concerns that the construction and operation of the Project do not adversely impact BNSF operations or

otherwise impose unacceptable safety risks to BNSF personnel and operations.

The consummation of the Project would require the granting of several licenses and permits from BNSF, which Applicant Calico Solar ("Calico Solar") has requested in a piecemeal fashion over the course of the past year. To date, none of these requested licenses or permits have been granted. Before BNSF can grant such licenses and permits, BNSF must be assured that its significant safety and operational concerns are addressed.

Q.4 What are BNSF's safety and operational concerns in relation to hazardous materials management (hydrogen)?

A.4 Calico Solar's Project certification application seeks authority to emplace up to 34,000 SunCatchers within a 6,215 acre tract that falls on both sides of BNSF's right of way. The SSA calls for the construction of one hydrogen gas production facility to be emplaced on an as-yet-to-be-determined site within the Project. (SSA p. C.5-8.) That single hydrogen gas facility would generate hydrogen gas to power the SunCatchers. The SSA, however, seeks approval for two distinctly different alternative methods to transmit the hydrogen to the SunCatchers.

Under the first alternative, the hydrogen would be transmitted via extensive shallow (approximate 2 ½ foot bgs) subterranean pipelines throughout the Project to the various SunCatchers (the specific emplacement of which was likewise not set forth in the SSA) and would

require boring under and hydrogen gas pipeline emplacement under the mainline.

BNSF's routine maintenance activities involve digging, trenching, excavating and filling areas of the right of way. A hydrogen pipeline located under or near the right of way could be contacted during these activities, posing a safety hazard to employees. Finally, if a derailment were to occur, given the desert sands, train cars could come in contact with the shallow underground pipeline system.

Under the second alternative scenario, hydrogen for the SunCatchers would be generated on-site and would be distributed to the SunCatchers via bottles carried on trucks. SSA p. C.5-8. This would involve individual SunCatchers being supplied from the hydrogen storage tank by trucks. An accident or collision between the hydrogen trucks and another vehicle or train at the at-grade crossing, or an accident on the proposed bridge, could result in significant safety issues.

Due to critical safety concerns, BNSF opposes the transport of hydrogen above or beneath its tracks. BNSF is concerned that hydrogen pipelines passing under or near the mainline track may adversely impact rail operations and create unacceptable safety risks.

Q.5 Have these safety and operational concerns been conveyed to Calico Solar?

A.5 They have. Applicant Calico Solar recently has represented that if it seeks to implement the first alternative and transmit the hydrogen through shallow, subterranean pipelines, it will produce hydrogen gas on two separate but as yet unidentified sites on the north and south sides of the BNSF Right of Way and thereafter construct two separate hydrogen gas pipeline systems (one northern and one southern) to transport the hydrogen gas to the respective SunCatchers, without going under the mainline.

Q.6 Does this adequately address BNSF's safety and operational concerns regarding this issue?

A.6 Not entirely. If the first alternative is employed, BNSF supports the placement of two separate hydrogen generation facilities, one north and one south of its tracks, and requests that this be incorporated into the Committee's decision on Calico Solar's application as a Condition of Certification.

I am not, however, aware of any site specific studies that address rail operations and safety issues in relation to the hydrogen pipe. Accordingly, if Calico Solar opts to employ the first alternative and use the centralized pipeline system, the appropriate distance of the nearest hydrogen pipelines to the right of way still needs to be determined.

BNSF requests that the Risk Analysis being prepared with respect to hydrogen consider possible derailment scenarios, appropriate mitigation be determined, and the system not be activated until all mitigation is fully implemented. BNSF also requests that should the centralized pipeline system be selected, the exact location of hydrogen pipelines in relation to the signal cable and the right of way be evaluated to ensure the protection of rail infrastructure and operations. In addition, BNSF requests that sensors be required to be placed to detect hydrogen leaks; that mitigation measures such as automatic shut-off valves along the hydrogen pipeline be required; that the Hazardous Business Materials Plan require notification of the railroad of hydrogen releases which could impact rail safety and operations; and that an auto-dialer and/or other notification system be established to promptly notify BNSF of such hydrogen releases.

Q.7 What are BNSF's safety and operational concerns in relation to biological resources (desert tortoise)?

A.7 In a derailment scenario, BNSF workers and emergency response personnel must have full access to BNSF's right of way and the adjacent lands in order to respond to the emergency. Such access will likely require temporary removal of portions of the desert tortoise exclusionary fence that Calico Solar is required to install as part of the Project. BNSF requests that, in the case of derailment or other emergency, Calico Solar

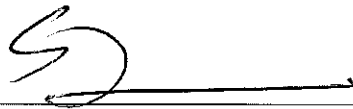
be required to provide BNSF access to the Project site for emergency response as a Condition of Certification. This access may include, among other activities, temporary removal of portions of the desert tortoise exclusionary fencing and the placement of a temporary fence. BNSF also requests that the Condition of Certification require Calico Solar contractors and employees to participate in BNSF's environmental sensitivity training program prior to commencing work at the Project site.

Q.8 Does this complete your direct testimony?

A.8 Yes, it does.

I swear under penalty of perjury that this testimony is true and correct to the best of my knowledge and belief.

Dated: July 29, 2010

A handwritten signature in black ink, consisting of a stylized 'E' followed by a horizontal line.

Edward P. Phillips

## **Edward Paul Phillips**

### **Curriculum Vitae**

As Manager of Environmental Operations for BNSF Railway, Mr. Phillips is responsible for environmental compliance throughout the state of California. A former state and county regulator, firefighter, and educator, Mr. Phillips has had extensive experience with hazardous materials management, emergency response, stormwater protection, air quality, energy conservation, and endangered species.

#### **October 2005 to Present**

#### **BNSF Railway**

##### **Manager, Environmental Operations**

- Responsible for overall environmental compliance within California including Hazardous Materials Business Plans; Industrial Stormwater Pollution Prevention Plans; Spill Prevention Control & Countermeasure Plans; and Facility Response Plans
- Responsible for tracking and developing compliance strategies for all emerging and ongoing regulations including federal, state, regional, and local programs for various agencies
- Responsible for developing and delivering Environmental Awareness Training to encompass all general and specific environmental issues to staff and contractors within California
- Responsible for assisting other departments with compliance issues
- Responsible for providing emergency response and incident management for train operations
- Responsible for providing emergency response training to local Fire Departments

#### **May 2005 to Present**

#### **Arkansas Department of Environmental Quality**

##### **Enforcement Administrator**

- Responsible for enforcing state water code including reviewing Discharge Monitoring Reports and field inspections for compliance with NPDES requirements, writing Significant Non-Compliance (SNC) correspondence, Notices of Violation (NOV), Clean and Abate Orders (CAO), and Cease and Desist Orders (CAD)
- Responsible for calculated penalties to be assessed for non-compliance
- Responsible for initiating enforcement actions against violators

#### **March 2003 to May 2005**

#### **Riverside County Environmental Health**

##### **Hazardous Materials Management Specialist III**

- Responsible for enforcing state health and safety code including conducting inspections of permitted facilities that stored hazardous materials, generated hazardous wastes, and/or operated underground storage tanks
- Responsible for conducting preliminary investigations into illegal activities and writing Administrative Enforcement Orders (AEO) and felony cases against violators
- Responsible for responding to emergencies involving hazardous materials throughout the County of Riverside as part of County Hazardous Materials Emergency Response Team

**January 2001 to March 2003**

**San Manuel Band of Mission Indians**

Environmental Coordinator

- Responsible for developing and managing Tribe's environmental program including air, land, cultural and water resources
- Responsible for writing and administering U.S.EPA Grants
- Responsible for assisting other departments with environmental compliance issues

**September 2001 to Present**

**Crest Forest Fire District**

Volunteer Firefighter

- Responsible for responding to structure fires, wildland fires, traffic collisions and medical aids

**September 1998 to December 2000**

**Fallbrook High School /Ranchero Middle School**

Science Teacher

- Responsible for teaching Life, Earth, and Physical Science to disadvantaged students
- Responsible for managing Science Department Title IX (underserved) funds

**January 1998 to August 1998**

**Bakersfield College**

Program Manager

- Responsible for developing program to assist small businesses comply with California Hazardous Waste Law
- Responsible for negotiating agreements with local agencies to provide training to small businesses

**Education**

Bachelor of Science, Biology 1997, California State University Bakersfield

**Certificates**

Registered Environmental Manager 2002-2010

Registered Environmental Assessor I 2004-2010

Certified Professional in Erosion and Sediment Control 2008-2010

Certified Professional in Storm Water Quality 2008-2010

CSTI Hazardous Materials Technician 2003-2006

TTCI Railcar Hazardous Materials Technician 2006-2010

CPR/First Responder 2001-2010





**BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT  
COMMISSION OF THE STATE OF CALIFORNIA  
1516 NINTH STREET, SACRAMENTO, CA 95814  
1-800-822-6228 – WWW.ENERGY.CA.GOV**

**APPLICATION FOR CERTIFICATION**

***For the CALICO SOLAR (Formerly SES Solar One)***

**Docket No. 08-AFC-13**

**PROOF OF SERVICE  
(Revised 7/12/10)**

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DECLARATION OF SERVICE

I, Ani Seferyan, declare that on July 29, 2010, I served and filed copies of the attached  
PREPARED DIRECT TESTIMONY OF EDWARD R. PHILLIPS BNSF RAILWAY COMPANY

dated July 29, 2010. The original document, filed with the Docket Unit, is accompanied by a copy of  
the most recent Proof of Service list, located on the web page for this project at:  
[www.energy.ca.gov/sitingcases/solarone].

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and  
to the Commission's Docket Unit, in the following manner:

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\_\_\_\_\_ by personal delivery;  
\_\_\_\_\_ by delivering on this date, for mailing with the United States Postal Service with first-class postage thereon  
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Sacramento, CA 95814-5512  
docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this  
mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

  
Ani Seferyan

\*indicates change 2



**BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT  
COMMISSION OF THE STATE OF CALIFORNIA  
1516 NINTH STREET, SACRAMENTO, CA 95814  
1-800-822-6228 – WWW.ENERGY.CA.GOV**

**APPLICATION FOR CERTIFICATION**

***For the CALICO SOLAR (Formerly SES Solar One)***

**Docket No. 08-AFC-13**

**PROOF OF SERVICE  
(Revised 8/9/10)**

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### DECLARATION OF SERVICE

I, Ani Seferyan, declare that on October 25, 2010, I served and filed copies of the attached "Attachment B - Exhibit 1201" dated October 25, 2010. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [\[www.energy.ca.gov/sitingcases/solarone\]](http://www.energy.ca.gov/sitingcases/solarone).

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*(Check all that Apply)*

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☐ by personal delivery;  
☐ by delivering on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses **NOT** marked "email preferred."

**AND**

#### FOR FILING WITH THE ENERGY COMMISSION:

- ☒ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (*preferred method*);

**OR**

- ☐ depositing in the mail an original and 12 paper copies, as follows:

#### **CALIFORNIA ENERGY COMMISSION**

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1516 Ninth Street, MS-4  
Sacramento, CA 95814-5512  
[docket@energy.state.ca.us](mailto:docket@energy.state.ca.us)

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

\_\_\_\_\_  
/s/ Ani Seferyan  
Ani Seferyan

# **STATE OF CALIFORNIA**

## **Energy Resources Conservation And Development Commission**

In the Matter of:  
The Application for Certification  
for the Calico Solar Power Project  
Licensing Case

Docket No. 08-AFC-13

### **INTERVENOR BNSF's COMMENTS ON THE PMPD**

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P	BNSF Post-Hearing Brief
Q	BNSF Comments and Protests to FEIS
R	BNSF Supplemental Comments and Protests to FEIS
S	Sierra Club's PMPD Comments
T	CURE's PMPD Comments

# STATE OF CALIFORNIA

## Energy Resources Conservation And Development Commission

In the Matter of:  
The Application for Certification  
for the Calico Solar Power Project  
Licensing Case

Docket No. 08-AFC-13

### PREPARED DIRECT TESTIMONY OF THOMAS SCHMIDT BNSF RAILWAY COMPANY

July 29, 2010

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Attorneys for Intervenor  
BNSF Railway Company



PREPARED DIRECT TESTIMONY

OF

Thomas Schmidt

Director Engineering Services – BNSF

Q.1 Please state your name and occupation?

A.1 My name is Thomas Schmidt. I am Director of Engineering Services, BNSF Railway Company ("BNSF"). My resume is attached to this testimony.

Q.2 What is the purpose of your testimony in this proceeding?

A.2 I will testify on two areas of concern to BNSF:

- (1) soil and water resources (detention basins); and
- (2) hydrology (subsidence).

Q.3 Why does BNSF have concerns regarding the Calico Solar Project?

A.3 BNSF is one of two Class 1 railroads operating in California. BNSF's mainline, which is traversed by as many as 80 trains per day, carries interstate commerce from the Ports of Los Angeles and Long Beach to U.S. Midwestern, Southwestern and Eastern markets. The proposed Project would surround both sides of several miles of BNSF's mainline tracks. Accordingly, BNSF has significant concerns that the construction and operation of the Project do not adversely impact BNSF operations or otherwise impose unacceptable safety risks to BNSF personnel and operations.

The consummation of the Project would require the granting of several licenses and permits from BNSF, which Applicant Calico Solar ("Calico Solar") has requested in a piecemeal fashion over the course of the past year. To date, none of these requested licenses or permits have been granted. Before BNSF can grant such licenses and permits, BNSF must be assured that its significant safety and operational concerns are addressed.

Q.4 What are BNSF's safety and operational concerns in relation to soil and water resources (detention basins)?

A.4 BNSF is concerned that detention basins in the present documentation are possibly not sufficient to protect the tracks and their supporting structures. The Project incorporates detention basins that have been designed for a 100 year flood. SSA. P. C.7-26. Given the gradient of the Project site, BNSF is concerned that the steps being proposed are not adequate to ensure protection of the tracks and their supporting structures or soil. A characteristic of high desert environs such as the Project site is an increased likelihood of flash floods, which over a sustained period of hours or days may cause the detention basins to overflow and cause a high volume of water in a concentrated flow to wash through the area, eroding the terrain around and supporting the tracks. As the former roadmaster for territory adjacent to this portion of the mainline, I have personal experience with sudden flash floods in the desert.

Q.5 Are you aware of any site specific studies that address the potential impact to the rail if there is a sudden and catastrophic rupture or overtopping of one or more of the detention basins?

A.5 No. It needs to be determined whether Calico Solar should be required to fund the reinforcement of rail infrastructure.

Q.6 What are BNSF's safety and operational concerns in relation to hydrology (subsidence)?

A.6 BNSF understands that, under the current application, Calico Solar intends to draw water from a water well on the Project site. BNSF is concerned the potential drawdown of the groundwater basin by the newly proposed water well may cause subsidence which might adversely affect rail track alignment, increasing the risk of increased maintenance of a derailment. While the SA/DEIS briefly addresses the issue of possible subsidence due to groundwater pumping at p. C.4-12, and the SSA discusses the issue at C.4-13 (Geology and Paleontology), BNSF is concerned that the analysis may not be sufficient. In addition, while Calico Solar represents that it is currently the only water user in the groundwater basin, BNSF notes that it intends to preserve the option of replacing its abandoned wells in the Hector Road location.

BNSF understands that Calico Solar is required to conduct groundwater monitoring on a quarterly basis. BNSF requests that as a Condition of Certification, Calico Solar be required to provide BNSF with such quarterly reports, and that a notification procedure be put in place for any

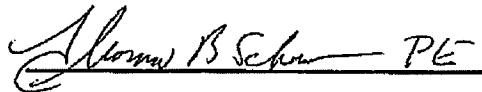
noted subsidence, whereby BNSF maintenance teams would be alerted of the issue.

Q.7 Does this complete your direct testimony?

A.7 Yes, it does.

I swear under penalty of perjury that this testimony is true and correct to the best of my knowledge and belief.

Dated: July 29, 2010

A handwritten signature in cursive script, reading "Thomas B. Schmidt", followed by the letters "PE" in a stylized, possibly printed or blocky font. The signature is written in black ink on a white background.

Thomas Schmidt

**Thomas Schmidt, P.E.**

**Curriculum Vitae**

As Director Engineering Services – BNSF Railway Company, Mr. Schmidt is responsible for management of construction activities within the BNSF railway system from Chicago to Los Angeles. As part of his 34-year tenure with BNSF, Mr. Schmidt spent 14 years working in BNSF's track department handling the issues to which the railroad is exposed on a regular basis throughout the country arising from flooding and other natural disasters. During this time, Mr. Schmidt spent six months in Needles, California, where, among other things, he handled the specific flood and disaster issues which arise in a desert environment.

**1990-current**

**BNSF Railway Engineering Department**

**Director Engineering Services (1995-current)**

- Responsible for management of new construction and expansion of facilities and physical plants pertinent to railroads, including mainlines, sidings and intermodal facilities.
- Assist track department with maintenance of track and roadbed.
- Responsible for permitting, mitigation, and reconstruction both for new development and in response to catastrophic events, as needed.

**Construction Engineer (1990-1995)**

**1976-1990**

**BNSF Railway Track Department**

**Assistant Division Engineer (1982-1990)**

**Roadmaster (1980-1982)**

**Assitant Roadmaster, Management Trainee (1976-1980)**

**Education**

B.S. Civil Engineering University of Kansas 1975  
Licensed Professional Engineer licensed in State of Kansas



BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT  
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**APPLICATION FOR CERTIFICATION**

*For the CALICO SOLAR (Formerly SES Solar One)*

**Docket No. 08-AFC-13**

**PROOF OF SERVICE**  
*(Revised 7/12/10)*

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\*indicates change

### DECLARATION OF SERVICE

I, Harriet Vletas, declare that on July 30, 2010, I served and filed copies of the attached Prepared Direct Testimony of Thomas Schmidt, dated July 29, 2010. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [www.energy.ca.gov/sitingcases/solarone].

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

*(Check all that Apply)*

#### FOR SERVICE TO ALL OTHER PARTIES:

- ☒ sent electronically to all email addresses on the Proof of Service list;
- ☐ by personal delivery;
- ☐ by delivering on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses **NOT** marked "email preferred."

**AND**

#### FOR FILING WITH THE ENERGY COMMISSION:

- ☒ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (*preferred method*);

**OR**

- ☐ depositing in the mail an original and 12 paper copies, as follows:

**CALIFORNIA ENERGY COMMISSION**  
Attn: Docket No. 08-AFC-13  
1516 Ninth Street, MS-4  
Sacramento, CA 95814-5512  
docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

  
HARRIET VLETAS



**BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT  
COMMISSION OF THE STATE OF CALIFORNIA  
1516 NINTH STREET, SACRAMENTO, CA 95814  
1-800-822-6228 – WWW.ENERGY.CA.GOV**

**APPLICATION FOR CERTIFICATION**

***For the CALICO SOLAR (Formerly SES Solar One)***

**Docket No. 08-AFC-13**

**PROOF OF SERVICE  
(Revised 8/9/10)**

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### DECLARATION OF SERVICE

I, Ani Seferyan, declare that on October 25, 2010, I served and filed copies of the attached "Attachment C - Exhibit 1202" dated October 25, 2010. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [\[www.energy.ca.gov/sitingcases/solarone\]](http://www.energy.ca.gov/sitingcases/solarone).

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

*(Check all that Apply)*

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- ☒ sent electronically to all email addresses on the Proof of Service list;  
☐ by personal delivery;  
☐ by delivering on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses **NOT** marked "email preferred."

**AND**

#### FOR FILING WITH THE ENERGY COMMISSION:

- ☒ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (*preferred method*);

**OR**

- ☐ depositing in the mail an original and 12 paper copies, as follows:

#### **CALIFORNIA ENERGY COMMISSION**

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1516 Ninth Street, MS-4  
Sacramento, CA 95814-5512  
[docket@energy.state.ca.us](mailto:docket@energy.state.ca.us)

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

\_\_\_\_\_  
/s/ Ani Seferyan  
Ani Seferyan

# **STATE OF CALIFORNIA**

## **Energy Resources Conservation And Development Commission**

In the Matter of:  
The Application for Certification  
for the Calico Solar Power Project  
Licensing Case

Docket No. 08-AFC-13

### **INTERVENOR BNSF's COMMENTS ON THE PMPD**

## ATTACHMENTS

A	Exhibit 1200
B	Exhibit 1201
C	Exhibit 1202
D	Exhibit 1203
E	Exhibit 1204
F	Exhibit 1205
G	Exhibit 1206
H	Exhibit 1207
I	Exhibit 1208
J	Exhibit 1209
K	Exhibit 1210
L	Exhibit 1211
M	Exhibit 1212
N	Exhibit 1213
O	Exhibit 1214
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S	Sierra Club's PMPD Comments
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# STATE OF CALIFORNIA

## Energy Resources Conservation And Development Commission

In the Matter of:  
The Application for Certification  
for the Calico Solar Power Project  
Licensing Case

Docket No. 08-AFC-13

### PREPARED DIRECT TESTIMONY OF JOSEPH SCHNELL BNSF RAILWAY COMPANY

August 17, 2010

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Attorneys for Intervenor  
BNSF Railway Company

PREPARED DIRECT TESTIMONY

OF

Joseph Schnell

Manager Special Projects – Signal, BNSF

Q.1 Please state your name and occupation?

A.1 My name is Joseph Schnell. I am the Manager Special Projects – Signal, for BNSF Railway Company ("BNSF"). My resume is attached to this testimony.

Q.2 What is the purpose of your testimony in this proceeding?

A.2 I will testify transportation (glint and glare).

Q.3 Why does BNSF have concerns regarding the Calico Solar Project?

A.3 BNSF is one of two Class 1 railroads operating in California. BNSF's mainline, which is traversed by as many as 80 trains per day, carries interstate commerce from the Ports of Los Angeles and Long Beach to U.S. Midwestern, Southwestern and Eastern markets. BNSF's mainline has operated through the section of the proposed Project since the late 19<sup>th</sup> Century. Preliminarily, whether emplacing tens of thousands of SunCatchers immediately adjacent to both sides of one of only two strategic transcontinental transportation corridors for rail traffic from the west coast to all points east is a compatible use has not been addressed or analyzed. The proposed Project would surround both sides of several miles of BNSF's mainline tracks. Accordingly, BNSF has significant concerns that the construction and operation of the Project do not

adversely impact BNSF operations or otherwise impose unacceptable safety risks to BNSF personnel and operations. BNSF must continue to maintain sole and independent discretion to ensure that its rail operations are safe and efficient. In addition, as a transcontinental railroad impacting interstate commerce, BSNF is subject to federal regulations and oversight.

The consummation of the Project would require the granting of several licenses and permits from BNSF, which Applicant Calico Solar ("Calico Solar") has requested in a piecemeal fashion over the course of the past year. To date, only preliminary access agreements have been granted. Before BNSF can grant such licenses and permits, BNSF must be assured that its significant safety and operational concerns are addressed.

Q.4 What are BNSF's safety and operational concerns in relation to transportation (glint and glare)?

A.4 BNSF's mainline, along which the Project is proposed to be built, is curved. An essential signal for rail traffic is located in the vicinity near Hector Road. Signals are critical safety features. Calico Solar's Project certification application seeks authority to emplace up to 34,000 SunCatchers within a 6,215 acre tract that falls on both sides of BNSF's right of way.

While there are no drawings or diagrams that specify precisely where the SunCatchers will be emplaced, Calico Solar proposes to locate the nearest SunCatchers as close as 100' from the BNSF

right of way, on both sides of the transcontinental mainline track,  
for approximately five miles.

Q.4 Why does the emplacement of the SunCatchers cause operational and safety concerns for BNSF?

A.4 Because daytime glint and glare from the 34,000 SunCatcher mirrors and associated structures, in particular when the mirrors are in offset tracking position, may significantly impact BNSF engineers' ability to see the signal. The situation would be exacerbated by the site elevations which Calico Solar has proposed.

Q.5 In addition to the safety concerns, are there federal regulations that govern signals?

A.5 Yes. BNSF is required by federal regulations and the Federal Railway Administration ("FRA") to maintain visual contact with signals. If a train's contact with a signal is lost and cannot be regained, the engineer is required to stop the train. This often requires an emergency application of the brakes, risking derailment of the train. When a train has been stopped through emergency application of the brakes, BNSF General Code of Operating Rule 6.23 requires the engineer to inspect all cars, units, equipment and track pursuant to BNSF special instructions and rules. This can cause significant delays to rail operations with ramifications reaching from the Ports of Los Angeles and Long Beach to Chicago and beyond.



Q.6 Have you had an opportunity to review the SSA Part II as it pertains to Traffic and Transportation (glare & glint)?

A.6 Yes.

Q.7 Does it adequately address BNSF's concerns?

A.7 No, it does not. To date, there is no study that has been performed that:

- a. analyzes and measures the impact on BNSF rail operations;
- b. analyzes and measures the glint and glare that will be produced from the SunCatchers in relation to the specifics heights, elevations, and angles relating to an engineer traveling along the curved track along the BNSF RoW;
- c. ascertains what, if any, measures could be implemented to adequately mitigate the impact of the SunCatchers' glint and glare to ensure the safe operation of rail services along the BNSF RoW;
- d. ascertains what evaluation, testing, coordination, and approval would be necessary to obtain government approval for any such mitigating measures.

Q.8 The SSA Part II represents at C.11-31 that "Staff has been working with representatives from BNSF Railways since July 16, 2010, to resolve BNSF Railway's concerns with glint and glare. As its usual procedure, staff commissioned a glint and glare study, which is attached to this document." Has that occurred?

A.8 Somewhat, but that is, at best, incomplete. Initially, the study did not address the rail safety and operational issues raised by BNSF. We were told that Staff was going to expand the scope of its glare/glint study to address these issues. In a call facilitated by CEC Staff person Marie McLean, I initially spoke with Cliff Ho of Sandia labs. Mr. Ho explained that he had been asked to perform some calculations to determine what the appropriate safe distance was from the SunCatcher for a motorist. His work was not specific to the Calico Solar facility, nor did it address rail operations and safety. Ms. McLean then facilitated a second call, to James Jewell, the consultant retained by Staff to head the study. Mr. Jewell requested information from BNSF that he represented was essential for him to complete his study. Attached hereto as Exhibit "A" is a string of emails that started on July 29, 2010 from Mr. Jewell. In his July 29<sup>th</sup> email, Mr. Jewell asked BNSF to provide him with information regarding:

1. height of signal poles,
2. height of the mid-point of the signal above the track,
3. height of the eyes of the average engineer above the track,
4. distance from a signal pole at which an engineer is expected to recognize and act upon a signal,
5. average width or consistent width of the BNSF ROW, and
6. number and location of signal poles within the solar plant area and just before or after the plant boundary.

Mr. Jewell represented that he needed this information to "establish the viewing angles and distances and then to discern just which signals may be seen against the SunCatcher mirrors and at what angular relationships. All of this information will make it possible for me to establish the requirements of a study."

Accordingly, as can be seen from the string of emails, there is no glare/glint study that addresses the issues raised by BNSF and confirmed as appropriate for a study by CEC's own consultant.

Q.9 Was the requested information provided to Mr. Jewell?

A.9 In part. We began providing the requested information but received an email from Mr. Jewell on August 3, 2010, stating "the Commission staff (including me) will not work on this further since there is a COC requiring collaboration on a solution. But there will be a 'workshop' and I will, . . . Be Prepared. Thanks for all your help. I think I can help at the workshop." [See Exhibit "A."]

Q.10 When did you receive the SSA Part II?

A.10 August 9, 2010.

Q.11 Were you surprised when you read it?

A.11 Absolutely. The SSA Part II could be misread and misinterpreted to read as if BNSF fully participated, there was a study performed to address the specific

rail safety and operations concerns raised by BNSF, we came to an agreement, and BNSF is satisfied that its safety concerns have been addressed and will be mitigated. That did not happen. We were told that Mr. Jewell was going to prepare a study that analyzed the glare and glint issue in relation to the unique angles and field of vision that an engineer would encounter while traveling along the RoW. We provided information that Mr. Jewell represented he needed to perform his study. That information was not used or referenced in the study. Then Mr. Jewell sent us an email saying no further work would be done and that we would collaborate on a solution. He said there would be a workshop. There was no workshop.

Q.12 The SSA Part II states at C.11-31 that "staff reviewed the glint and glare study and mitigation measures with BNSF Railway representatives. The review included telephone conversations with Energy Commission glint and glare consultants to ensure BNSF Railway's concerns were addressed." Were BNSF's concerns addressed.

A.12 First of all, the telephone conversations with the CEC consultants took place without the benefit of a draft report or any supporting information or consultants. While we were told it would be available before the issuance of the Supplemental Staff Report, that did not occur. Accordingly, the conversations were very general in nature and did not address BNSF's specific concerns. Because no study had been performed, there was no meaningful discussion regarding mitigation measures. At the time that the CEC decided that it would not perform its own study to address BNSF's

rail safety issues and concerns, we were advised that CEC was going to require: (1) a 300 foot setback from the edge of the BNSF RoW for the closest SunCatcher; (2) a site-specific study on the effects of the SunCatcher's glint and glare on BNSF's safety, operations and signals, funded by Calico Solar; and (3) workshops to be held to resolve BNSF's concerns. The CEC also offered to assist BNSF find a glint/glare expert with appropriate expertise. Moreover, we only had a little over a week between the issuance of the SSA Part II and the hearing. This is not adequate time to address all of the issues raised for the first time in the SSA Part II. When I actually read TRANS-7 it was clear that BNSF's concerns had not been addressed and that conclusions had been drawn about purported mitigation measures that were not based on any actual scientific study. We consistently told the Commission and Calico Solar that before BNSF can consider approving any further access to the BNSF RoW, the following Condition of Certification must be incorporated into the Project:

Prior to the first SunCatcher disc being mounted on a pedestal, a site-specific Glare/Glint study shall be performed at Calico Solar's expense to address the Glare/Glint issues raised by BNSF with respect to the potential impact of the proposed Calico Solar SunCatchers on BNSF rail operations. The recommended mitigation measures shall be reviewed by BNSF. If BNSF approves the recommended mitigation measures, they will be

implemented by Calico Solar at its expense. The site specific study shall commence immediately upon BNSF's selection of the experts to perform the study.

Q.13 The SSA Part II also states at C.11-32 that "BNSF Railway's representatives also expressed a concern about glint and glare and its effects upon the railroad engineer's ability to correctly perceive the color of the signal. Through several telephone conversations, staff and commission's glint and glare consultants discussed with BNSF Railway representatives their specific concerns about the signal lights. Staff determined that measures exist, if needed, to ensure that BNSF Railway engineers will be able to correctly perceive the color of the signal. Those procedures involve hooding and increasing the intensity of the lights." Is that accurate?

A.13 No. Again, as stated above, we only had two general conversations with the CEC consultants. We talked about our concern about seeing the signal, identifying the color of the signal, being able to identify the signal if the background consisted of thousands of mirrored surfaces, our concerns regarding "phantom signals" where the light reflected inside the signal gives a false reading that the signal is on, and a potential "funhouse" effect where a signal is reflected in a mirror that is one of a bank of thousands of mirrors and gives the false appearance that it is in a location other than the one it is actually in. We consistently told the Commission and its consultants that BNSF must exercise its independent judgment to protect the safety and operations of its transcontinental rail system. Some of the options that might be considered after a thorough study

of the potential impact on rail safety and operations of Calico Solar's proposed facility on BNSF may, in addition, require federal government approval. BNSF has specifically advised CEC's consultant, pending ongoing studies in other arenas, it did not know if signal light strength could be increased or if alternative methods of "hooding" a signal would help the engineer identify the signal. To date, I have seen no studies or technical data regarding hooding, increased light signal strength, use of LED lights, or other signal mitigation measures that would support Staff's conclusions in this regard.

Q.14 Does this complete your direct testimony?

A.14 Yes, it does.

I swear under penalty of perjury that this testimony is true and correct to the best of my knowledge and belief.

Dated: August 16, 2010

  
\_\_\_\_\_  
Joseph Schnell

## **Joseph D. Schnell**

669 Cattlemans Way  
Fort Worth, TX 76131  
(425) 213-7284  
[Joseph.Schnell@BNSF.com](mailto:Joseph.Schnell@BNSF.com)

### **Education:**

Electrical Engineering Degree with emphasis in Electronics and Management, University of Nebraska-Lincoln, Lincoln, Nebraska  
Graduation Date: May 2006

### **Internship Experience:**

**Summer 2005: Engineering Intern**, Burlington Northern Santa Fe Railway, based in Amarillo, Texas.

Duties included traveling across Texas, Oklahoma and Kansas working with different level employees within the signal department in the areas of construction and maintenance.

**May 2004 to December 2004: Project Engineer Co-op**, Nebraska Public Power District, Beatrice Power Station, Beatrice, Nebraska.

Duties included functional location tagging, document control, and database management.

**Summer 2003: Technical Director Management Intern**, General Electric Transportation Systems, Bailey Yard, North Platte, Nebraska.

Duties included heading up EOA satellite communications system implementation, numerous software upgrades, and quality control projects. Completed first step of six sigma training.

### **Research Experience:**

**January 2003 to May 2004: Undergraduate Research**, Centre of Electro Optics, University of Nebraska-Lincoln.

Performed laser induced breakdown spectroscopy research under Dr. Dennis R Alexander.

### **Volunteer Experience:**

**February 2002 to May 2006: Teachers Aide**, Norwood Park Elementary School, Lincoln, Nebraska.

Helped with clerical work, assisted with teaching, and worked one-on-one with students in the areas of reading, math and English.

### **Honors and Awards:**

Passed Fundamentals of Engineering Exam, October 2005

Holling Memorial Scholarship, 2005

VIP Outstanding Volunteer Award, 2003

UNL Undergraduate Creative Activities and Research Experiences Award, 2003

UNL Engineering Departmental Scholarship, 2001

UNL Canfield Scholarship, 2001



## **BNSF Experience:**

### **April 2010 to Present: Manager Special Projects – Signal, Fort Worth, Texas.**

As the manager of special projects, I am responsible for the signal departments reporting to the FRA, as well as notifications to the BRS. I manage several databases and sections for the signal scorecard and website. Along with these duties I manages other engineering projects such as power line mitigation, work equipment issues, and other issues the directly effect the signal department.

### **February 2009 to April 2010: Supervisor Signals, Vancouver, Washington.**

I made a developmental move to coordinate the signal maintenance activities on the Fallbridge, Yakima Valley and Stampede Subdivisions. In making that move I was afforded the opportunity to expand my knowledge base and improve my skills as a supervisor. During my as the Vancouver supervisor I became intimately knowledgeable in CTC signaling, as well as educated in train operations on high traffic lines. I have planned windows around and with major production gangs and for pole line contractors. On the construction side I have surveyed several crossings and solar locations for pole line removal. I have also been fortunate in that I was able to participate in several major cut-over's with our Northwest Signal Construction team.

I was also given the opportunity to attend an FLS forum at Garret Creek Ranch. During my time at the forum was able to give input on everything from manpower issues to our current computer system.

### **April 2007 to February 2009: Supervisor Signals, Bend, Oregon.**

Duties have included the coordination of maintenance activities on the Oregon trunk and Gateway sub-divisions through the Maintenance Excellence system. Included within this system are managing a capital and operating budget, keeping up on FRA mandated testing, tracking service bulletin upgrades, managing vehicle maintenance and upkeep, ordering and tracking material and coordinating the training and progression of my team.

My main two focal points while in Bend have been team development and physical plant improvement. The Signal Team lacked cohesiveness and a proper sense of direction, but has now developed into a real team with focused job priorities. We have been able to improve numerous crossings with new installations of motion sensing devices, event recorders, and gate mechanisms. We have also upgraded commercial power service and standby power across the board, improving reliability greatly.

I have attended a management trainee forum at Garret Creek Ranch and become a part of the recruiting team for the University of Nebraska-Lincoln. I am also scheduled to begin the signal apprentice classes in the fall of 2008.

### **December 2006 to April 2007: Assistant Supervisor Signals Construction, Northwest Division based out of Seattle, Washington.**

Duties included working on signal construction projects with the Northwest signal construction team, as well as spending time assisting maintenance supervisors with projects and vacation relief. Notable projects worked on are listed as follows:

- Crossing installations in Bellingham, Washington

- Electrocode upgrades in New Westminster, British Columbia

- Electrocode upgrades on the Fallbridge subdivision, Wishram, Washington

- Electrocode upgrades, switch upgrades and crossing upgrades in the Vancouver Yard, Vancouver, Washington

- Running signal crews during the 2007 Fallbridge Maintenance Blitz, Vancouver, Washington to Pasco, Washington

Time was spent surveying projects, working with crew foremen on scheduling construction activities, overseeing construction and pre cut-over breakdowns, helping to plan and run cutovers and in-servicing projects.

**June 2006 to December 2006: Management Trainee,** Completed formal training in Ft. Worth, Texas and Kansas City, Kansas with the engineering department.

Finished a six month management trainee program under Signal Manager Doug Proffitt in Seattle, Washington. Duties included completing cross-departmental training, as well as reaching set goals for training within the signal department.

**BNSF Formal Training**

Engineering Frontline Supervisor, June 2010

Engineering Frontline Supervisor, July 2009

Engineering Frontline Supervisor, June 2008

Engineering Frontline Supervisor, September 2007

Formal Investigation Training, May 2007

Fast Track Signal Training Program, January 2007

Engineering Operations Testing, December 2006

Leading People Successfully Engineering Part 2, November 2006

Engineering Frontline Supervisor, October 2006

Functional Engineering, September 2006

Supervisor FRA Track Safety, August 2006

---

**From:** James Jewell [mailto:jjewell@arch-light.com]  
**Sent:** Tuesday, August 03, 2010 11:41 AM  
**To:** Alexander, Anne  
**Subject:** Re: BNSF/Calico - Large Scale Map and Additional Measurement

ANNE -- You have been a great help. As you probably know the Commission staff (including me) will not work on this further since there is a COC requiring collaboration on a solution. But, there will be a "workshop" and I will, as they are saying at the Jamboree this week in Virginia, Be Prepared. Thanks for all the data. I think I can help at the workshop. JAMES

On 8/3/10 11:07 AM, "Alexander, Anne" <[anne.alexander@kattenlaw.com](mailto:anne.alexander@kattenlaw.com)> wrote:

All:

Attached is an electronic version of a map of the BNSF right of way requested last week.  
Also, our client has informed us that the distance at which an engineer needs to be able to

8/16/2010

Exhibit "A" to Schnell

see a signal is 1500 feet. Please let us know if you need anything else.

Anne

**ANNE ALEXANDER**

Associate

**Katten Muchin Rosenman LLP**

2029 Century Park East, Suite 2600 / Los Angeles, CA 90067-3012

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anne.alexander@kattenlaw.com <<mailto:william.kong@kattenlaw.com>>

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***PRIVILEGED & CONFIDENTIAL ATTORNEY-CLIENT COMMUNICATIONS  
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---

**From:** Alexander, Anne

**Sent:** Friday, July 30, 2010 3:30 PM

**To:** 'jjewell@arch-light.com'; 'alindsley@lindsleylighting.com'

**Cc:** 'Mmclean@energy.state.ca.us'; 'Dflores@energy.state.ca.us'; Burch, Cynthia Lea; Lamb, Steven A.

**Subject:** BNSF/Calico - Additional Measurements

James and Alan:

Again, we very much appreciate the quick turnaround on information requests. I am restating below the measurements from the signal head to the ground for the two signals at Hector Road (one signal for each track) which we sent yesterday, and have added some of the other information you requested yesterday. The height of the mid-point of the signal above the track would be the height of the yellow signal.

**Main Track 1**

Green signal to grade 30' 9"

Yellow signal to grade 29' 9"

Red signal to grade 28' 9"

Rail to grade 10'

Thus:

Green signal to rail: 20' 9"

Yellow signal to rail: 19' 9"

Red signal to rail: 18' 9"

**Main Track 2**

Green signal to grade 30'

Yellow signal to grade 29'

Red signal to grade 28'

Rail to grade 9'

Thus:

Green signal to rail: 21'  
Yellow signal to rail: 20'  
Red signal to rail: 19'

The engineer's eyes will be between 13 and 14 feet off the tracks. The width of the right of way is 100 feet through the project. There are a total of two signal poles within the Project site. We will provide you the distance from a signal pole at which an engineer is expected to recognize and act upon a signal on Monday.

Please do not hesitate to contact us with further questions or requests for information.

Have a great weekend,  
Anne

**ANNE ALEXANDER**

Associate

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**From:** Burch, Cynthia Lea  
**Sent:** Thursday, July 29, 2010 2:43 PM  
**To:** '[jjewell@arch-light.com](mailto:jjewell@arch-light.com)'; Alexander, Anne  
**Cc:** '[Mmclean@energy.state.ca.us](mailto:Mmclean@energy.state.ca.us)'; '[alindsley@lindsleylighting.com](mailto:alindsley@lindsleylighting.com)'; '[Dflores@energy.state.ca.us](mailto:Dflores@energy.state.ca.us)'  
**Subject:** Re: BNSF/Calico

James, thank you for quick turn around on data requests. We will forward them to BNSF.  
Cynthia

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**From:** James Jewell  
**To:** Burch, Cynthia Lea  
**Cc:** Marie McLean ; Lindsley, AIA, IESNA Alan ; David Flores  
**Sent:** Thu Jul 29 12:45:18 2010

**Subject:** BNSF/Calico

CYNTHIA — It was good to talk with you, Steve Ramsey, and the representative of BNSF. In our extended conversation there was some data that I didn't get to ask for so that I might make an initial estimate of the view angles involved. The conversation was helpful in that the applicants drawings do not show a double track installation.

I'll be away until Saturday, but perhaps your office or BNSF could send this along so I have it over the weekend. My colleague Alan Lindsley, who has been the lead light and vision consultant on Calico SPP, may have some further questions. If we can establish clearly the viewing angles, we may be able to predict and restrict the points of visual conflict for trainmen.

The following would be helpful:

- 1) height of the signal poles,
- 2) height of the mid-point of a signal above the track,
- 3) height of the eyes of the average engineer above the track; that is cab floor height plus seated viewer height,
- 4) distance from a signal pole at which an engineer is expected to recognize and act upon a signal,
- 5) average width or consistent width of the BNSF ROW, and
- 6) number and location of signal poles within the solar plant area and just before or after the plant boundary.

I think you can see that I want to establish the viewing angles and distances and then to discern just which signals may be seen against the Suncatcher mirrors and at what angular relationships. All of this information will make it possible for me to establish the requirements of a study. Thanks for your help. JAMES

=====

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NOTIFICATION: Katten Muchin Rosenman LLP is an Illinois limited liability partnership that has elected to be governed by the Illinois Uniform Partnership Act (1997).

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BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT  
COMMISSION OF THE STATE OF CALIFORNIA  
1516 NINTH STREET, SACRAMENTO, CA 95814  
1-800-822-6228 – WWW.ENERGY.CA.GOV

**APPLICATION FOR CERTIFICATION**

**For the CALICO SOLAR** (Formerly SES Solar One)

**Docket No. 08-AFC-13**

**PROOF OF SERVICE**  
(Revised 8/9/10)

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DECLARATION OF SERVICE

I, Harriet Vletas, declare that on August 17, 2010, I served and filed copies of the attached Prepared Direct Testimony of Joseph Schnell, BNSF Railway Company, dated August 17, 2010. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at:  
[www.energy.ca.gov/sitingcases/solarone].

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

*(Check all that Apply)*

FOR SERVICE TO ALL OTHER PARTIES:

- ☒ sent electronically to all email addresses on the Proof of Service list;
- ☐ by personal delivery;
- ☐ by delivering on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses **NOT** marked "email preferred."

AND

FOR FILING WITH THE ENERGY COMMISSION:

- ☒ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (*preferred method*);

OR

- ☐ depositing in the mail an original and 12 paper copies, as follows:

**CALIFORNIA ENERGY COMMISSION**  
Attn: Docket No. 08-AFC-13  
1516 Ninth Street, MS-4  
Sacramento, CA 95814-5512  
docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

  
HARRIET VLETAS



**BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT  
COMMISSION OF THE STATE OF CALIFORNIA  
1516 NINTH STREET, SACRAMENTO, CA 95814  
1-800-822-6228 – WWW.ENERGY.CA.GOV**

**APPLICATION FOR CERTIFICATION**

***For the CALICO SOLAR (Formerly SES Solar One)***

**Docket No. 08-AFC-13**

**PROOF OF SERVICE  
(Revised 8/9/10)**

**APPLICANT**

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### DECLARATION OF SERVICE

I, Ani Seferyan, declare that on October 25, 2010, I served and filed copies of the attached "Attachment D - Exhibit 1203" dated October 25, 2010. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [\[www.energy.ca.gov/sitingcases/solarone\]](http://www.energy.ca.gov/sitingcases/solarone).

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

*(Check all that Apply)*

#### FOR SERVICE TO ALL OTHER PARTIES:

- ☒ sent electronically to all email addresses on the Proof of Service list;  
☐ by personal delivery;  
☐ by delivering on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses **NOT** marked "email preferred."

**AND**

#### FOR FILING WITH THE ENERGY COMMISSION:

- ☒ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (*preferred method*);

**OR**

- ☐ depositing in the mail an original and 12 paper copies, as follows:

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[docket@energy.state.ca.us](mailto:docket@energy.state.ca.us)

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

\_\_\_\_\_  
/s/ Ani Seferyan  
Ani Seferyan

# **STATE OF CALIFORNIA**

## **Energy Resources Conservation And Development Commission**

In the Matter of:  
The Application for Certification  
for the Calico Solar Power Project  
Licensing Case

Docket No. 08-AFC-13

### **INTERVENOR BNSF's COMMENTS ON THE PMPD**

## ATTACHMENTS

A	Exhibit 1200
B	Exhibit 1201
C	Exhibit 1202
D	Exhibit 1203
E	Exhibit 1204
F	Exhibit 1205
G	Exhibit 1206
H	Exhibit 1207
I	Exhibit 1208
J	Exhibit 1209
K	Exhibit 1210
L	Exhibit 1211
M	Exhibit 1212
N	Exhibit 1213
O	Exhibit 1214
P	BNSF Post-Hearing Brief
Q	BNSF Comments and Protests to FEIS
R	BNSF Supplemental Comments and Protests to FEIS
S	Sierra Club's PMPD Comments
T	CURE's PMPD Comments

# STATE OF CALIFORNIA

## Energy Resources Conservation And Development Commission

In the Matter of:  
The Application for Certification  
for the Calico Solar Power Project  
Licensing Case

Docket No. 08-AFC-13

### PREPARED DIRECT TESTIMONY OF DENNIS SKEELS BNSF RAILWAY COMPANY

August 17, 2010

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PREPARED DIRECT TESTIMONY

OF

Dennis Skeels

Manager Signals California Division – BNSF

Q.1 Please state your name and occupation?

A.1 My name is Dennis Skeels. I am the Manager Signals, California Division, for BNSF Railway Company ("BNSF"). My resume was attached to my previous testimony.

Q.2 What is the purpose of your testimony in this proceeding?

A.2 I will testify regarding transportation (glint and glare).

Q.3 Why does BNSF have concerns regarding the Calico Solar Project?

A.3 BNSF is one of two Class 1 railroads operating in California. BNSF's mainline, which is traversed by as many as 80 trains per day, carries interstate commerce from the Ports of Los Angeles and Long Beach to U.S. Midwestern, Southwestern and Eastern markets. BNSF's mainline has operated through the section of the proposed Project since the late 19<sup>th</sup> Century. Preliminarily, whether emplacing tens of thousands of SunCatchers immediately adjacent to both sides of one of only two strategic transcontinental transportation corridors for rail traffic from the west coast to all points east is a compatible use has not been addressed or analyzed. The proposed Project would surround both sides of several miles of BNSF's mainline tracks. Accordingly, BNSF has significant



concerns that the construction and operation of the Project do not adversely impact BNSF operations or otherwise impose unacceptable safety risks to BNSF personnel and operations.

The consummation of the Project would require the granting of several licenses and permits from BNSF, which Applicant Calico Solar ("Calico Solar") has requested in a piecemeal fashion over the course of the past year. To date, only preliminary access agreements have been granted. Before BNSF can grant such licenses and permits, BNSF must be assured that its significant safety and operational concerns are addressed.

Q.4 What are BNSF's safety and operational concerns in relation to transportation (glint and glare)?

A.4 BNSF's mainline, along which the Project is proposed to be built, is curved. An essential signal for rail traffic is located in the vicinity near Hector Road. Signals are critical safety features and engineers must be able to see signals in sufficient time to respond accordingly to avoid potentially life-threatening events such as a derailment. Calico Solar's Project certification application seeks authority to emplace up to 34,000 SunCatchers within a 6,215 acre tract that falls on both sides of BNSF's right of way.

While there are no drawings or diagrams that specify precisely where the SunCatchers will be emplaced, Calico Solar proposes to locate the nearest

SunCatchers as close as 223' from the BNSF right of way, on both sides of the transcontinental mainline track, for approximately five miles.

Q.5 Why does the emplacement of the SunCatchers cause operational and safety concerns for BNSF?

A.5 Because daytime glint and glare from the 34,000 SunCatcher mirrors and associated structures, in particular when the mirrors are in offset tracking position, may significantly impact BNSF engineers' ability to see the signal. The situation would be exacerbated by the site elevations which Calico Solar has proposed. Additionally, refracted light radiating back from the SunCatchers could possibly introduce a light source that may cause a signal to display an aspect more favorable than what is intended. This can result in a phantom signal. Attached hereto as Exhibits "A" and "B" are photos showing a phantom signal.

Q.6 In addition to the safety concerns, are there federal regulations that govern signals?

A.6 Yes. BNSF is required by federal regulations and the Federal Railway Administration (the "FRA") to maintain visual contact with signals. If a train's contact with a signal is lost and cannot be regained, the engineer is required to stop the train. This often requires an emergency application of the brakes, risking derailment of the train. When a train has been stopped through emergency application of the brakes, BNSF General Code of Operating Rule 6.23 requires the engineer to inspect all cars, units,

equipment and track pursuant to BNSF special instructions and rules. This can cause significant delays to rail operations with ramifications reaching from the Ports of Los Angeles and Long Beach to Chicago and beyond.

Q.7 Have you had an opportunity to review the SSA Part II relating to traffic and Safety (Glint and Glare)?

A.7 Yes, I have.

Q.8 Does it adequately address BNSF's concerns?

A.8 No, it does not. To date, there is no study that has been performed that:

- a. analyzes and measures the impact on BNSF rail operations;
- b. analyzes and measures the glint and glare that will be produced from the SunCatchers in relation to the specifics heights, elevations, and angles relating to an engineer traveling along the curved track along the BNSF Right of Way ("RoW");
- c. ascertains what, if any, measures could be implemented to adequately mitigate the impact of the SunCatchers' glint and glare to ensure the safe operation of rail services along the BNSF RoW;
- d. ascertains what evaluation, testing, coordination, and approval would be necessary to obtain FRA approval for any such mitigating measures.

Q.9 Are there signals in the vicinity of the proposed Project that would be impacted by the project?

A.9 Yes, there are. Attached hereto as Exhibit "C" is an extract from a Track Chart, Needles Subdivision, which shows the locations of the signals in the proposed Project area. Starting on the page denoted with a circled 8 at the top right corner and reflecting mile markers 710 through 715 and then the following page denoted with a circled 9 at the top right corner and reflecting mile markers 705 through 710, these are the pages that relate to the proposed Project site. Various features are pointed out, to include train speed, crossings, signals, and hot box detectors, as well as curves and grade. As you can see, train speed varies based on whether it is freight or passenger and also varies based on the grade and curves. There are currently two crossings, one near Hector and one near West Pisgah. The Hector crossing has a signal before and after the crossing. The West Pisgah crossing has several signals on either side of the crossing and is near a 2 degree 10 minute turn.

BNSF is also concerned that the SunCatchers may impact the signals and hot boxes along the mainline because the signals and hotboxes are solar-powered. Accordingly, if the SunCatchers are too close to the mainline, the shadow from the SunCatchers could shade the signals and hotboxes, thereby eliminating their energy source and causing failure or malfunction. BNSF understands that Calico Solar has agreed not to emplace any SunCatcher within 223 feet of the RoW, which would mitigate this issue.

Finally, there is always a concern regarding transmission lines interfering with signals. BNSF understands that Calico Solar has agreed not to emplace any transmission line within 300 feet of the RoW and to only cross the RoW at a right angle sufficiently distant from a signal, thereby mitigating this issue.

Q.10 Does the SSA Part II account for the signals?

A.10 No. I am not aware of any maps or drawings that show the signals and the SSA Part II does not make any reference to where the signals are located.

Q.11 Based on these stated concerns, what is BNSF's proposal in relation to the glare and glint issue?

A.11 Before BNSF can consider approving any further access to the BNSF RoW, the following Condition of Certification must be incorporated into the Project:

Prior to the first SunCatcher disc being mounted on a pedestal, a site-specific Glare/Glint study shall be performed at Calico Solar's expense to address the Glare /Glint issues raised by BNSF with respect to the potential impact of the proposed Calico Solar SunCatchers on BNSF rail operations. The recommended mitigation measures shall be reviewed by BNSF. If BNSF approves the recommended mitigation measures, they will be implemented by Calico Solar at its expense. The site specific study

shall commence immediately upon BNSF's selection of the experts to perform the study.

Q.12 The SSA Part II at C.11-36-37 makes reference to signal light modifications. Have you reviewed it?

A.12 Yes, I have.

Q.13 Are the suggested modifications feasible?

A.13 SSA Part II at C.11-36 refers to "current LED signal technology." Based on my extensive experience, I am not aware of any such current approved LED signal technology. BNSF is currently conducting testing of LED signal lights, but there presently is no standard LED signal that has been tested and approved for use by BNSF. Moreover, shielding or hooding of signals requires coordination with federal authorities before we make any changes.

Q.14 Does this complete your direct testimony?

A.14 Yes, it does.

I swear under penalty of perjury that this testimony is true and correct to the best of my knowledge and belief.

Dated: August 17, 2010

*Dennis Skeels*  
Dennis Skeels

7:47 PM

RED LITE OFF

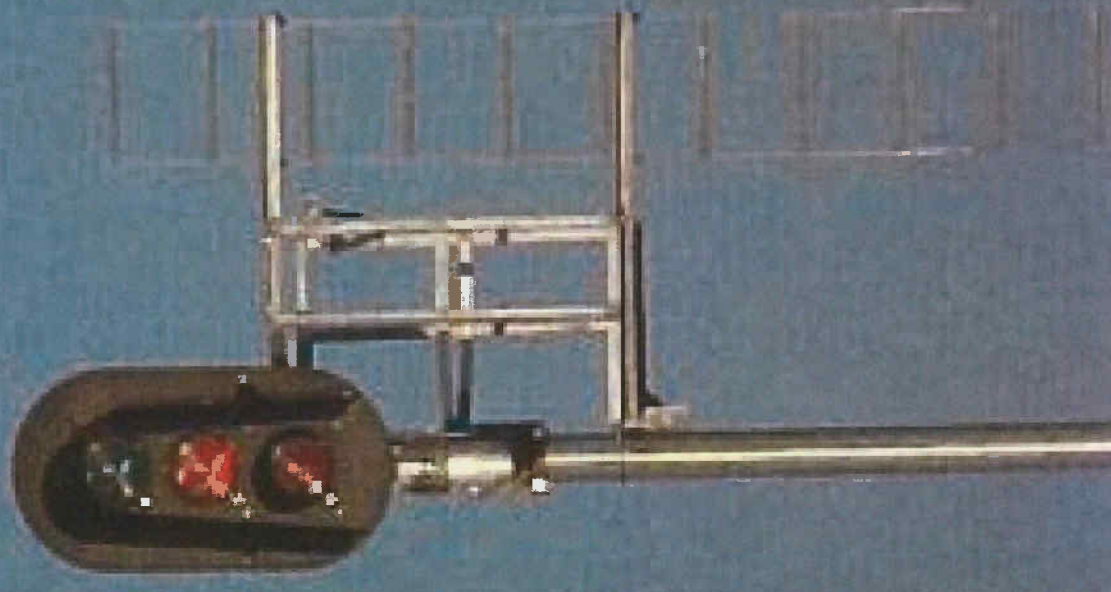


Exhibit A-1  
Skeels



6:25 PM

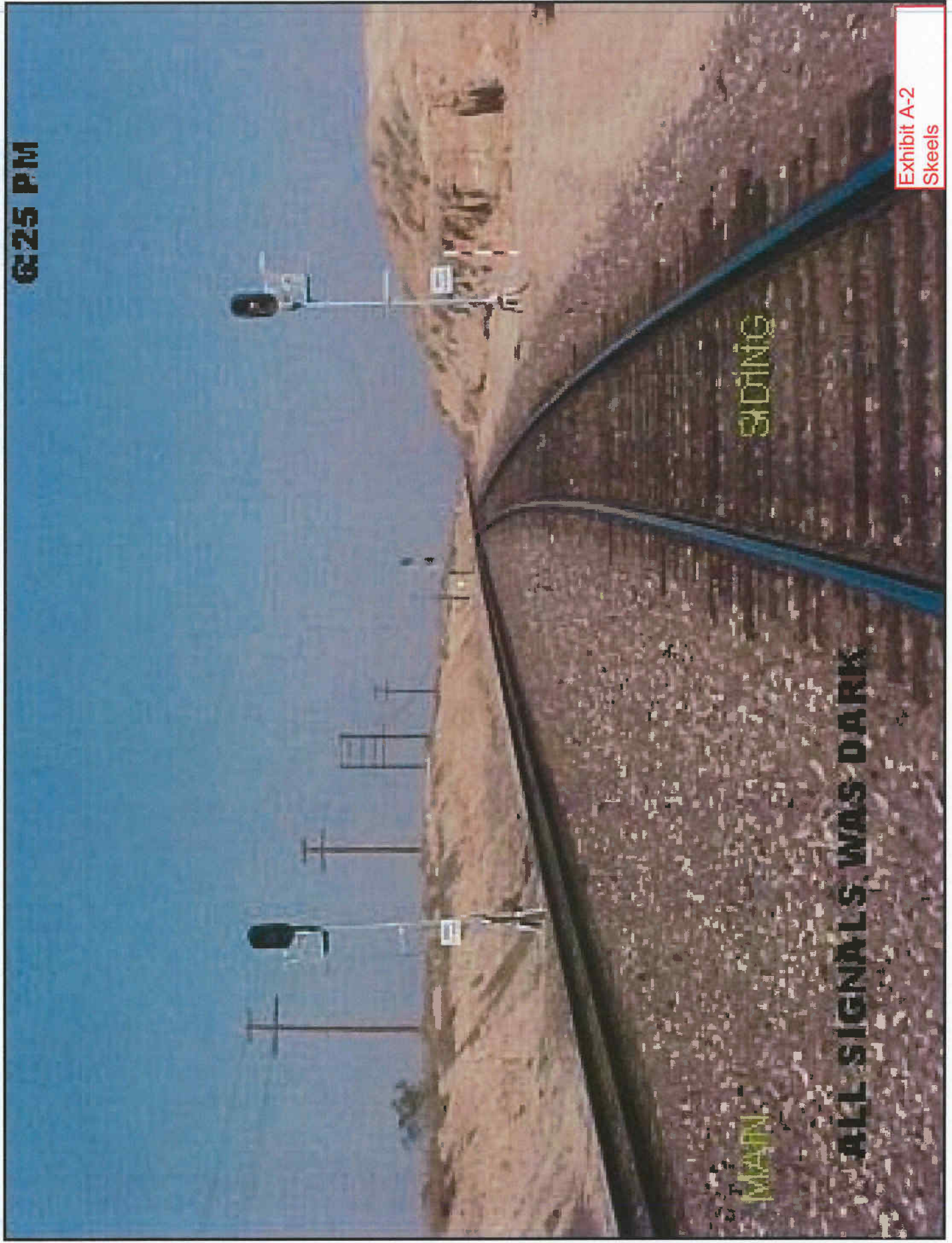


Exhibit A-2  
Skeels



**RED LITE ON**

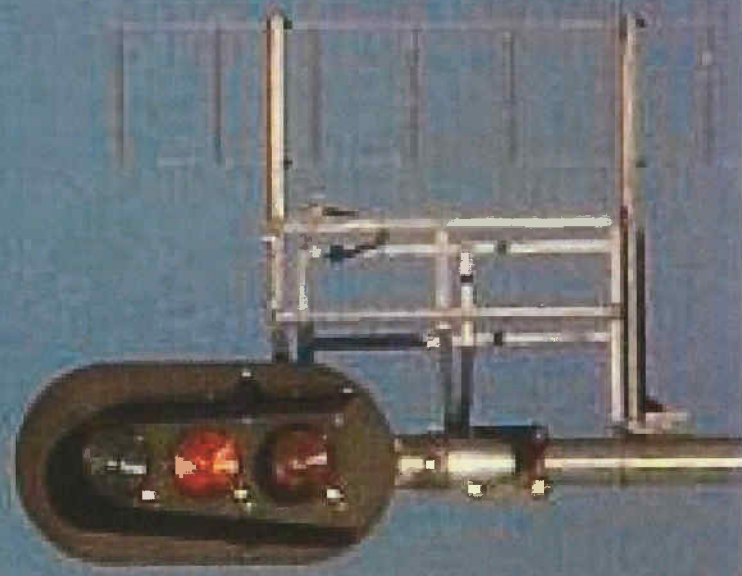


Exhibit B-1  
Skeels

7:32 PM

ALL LITES OFF



Exhibit B-2  
Skeels



# Track Chart

## Needles Subdivision

Needles, CA (M.P. 578.0) to Barstow, CA (M.P. 745.83)

*See each page for latest revised date*

To view on the intranet or print this Track Chart go to:  
<http://kcintvpd0001.iss.bnr.com/maprec/mapsrehome.htm>

Notes:

To order this Track Chart in Sourcenet or Millennium, use: 1363651

If you have any corrections or changes to these pages, either mail to the Manager of Maps and Records at 4515 Kansas Ave., Kansas City, KS 66106 or FAX to 913-551-4285. Mailing is preferred.

NEE000.DGN

BNSF System Maintenance and Planning

Barstow, CA

## Line Segment 7200

## Needles, CA

725

724

723

722

721

720

			OPER.
			OPER.
			F. SEED.
			F. SEED.
			P. SEED.
			P. SEED.

## CURVES.

**CURVES.**

GRADE

.82 PUB GR XING, F/G, 026044A  
 NEWBERRY RD  
 .78 AEI READER  
 .64 SIGS  
 .63 NO. 24 T.O.  
 .54 NO. 24 T.O.  
 .51 NO. 24 T.O.  
 .41 NO. 24 T.O.  
 .40 SIGS

78 SIGS

2710

5 0724

CP 7245  
M.P. 724.3

MATN

## MAIN

PATI

**PAT:**

TIES

TIES

SBC

UC

SBC

30

BNSF Railway Company

VS = AT CA-31

NEE006.DGN

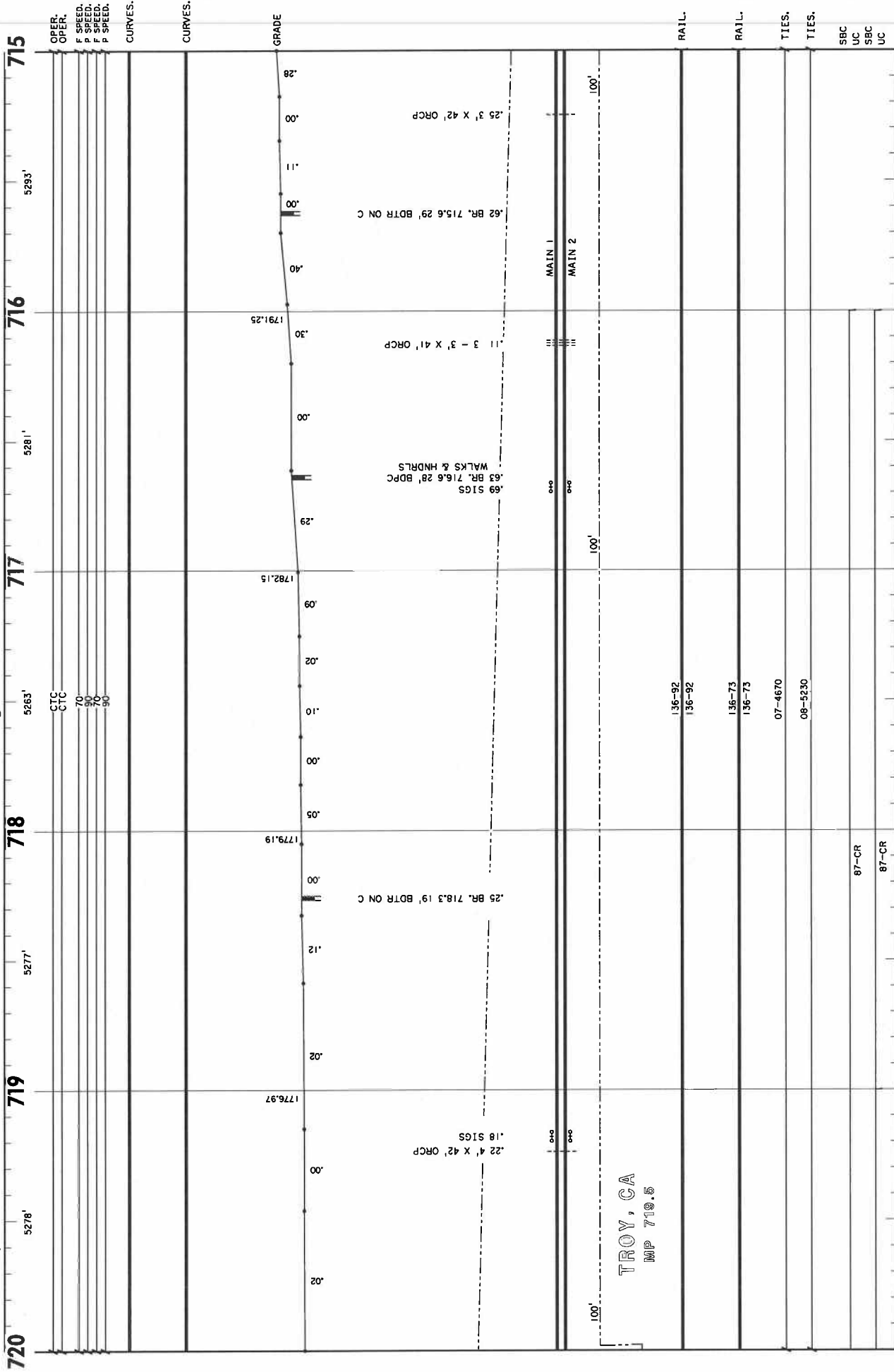
Revised: 07/13/2009

### Needles Subdivision

Barstow, CA

Line Segment 7200

Needles, CA

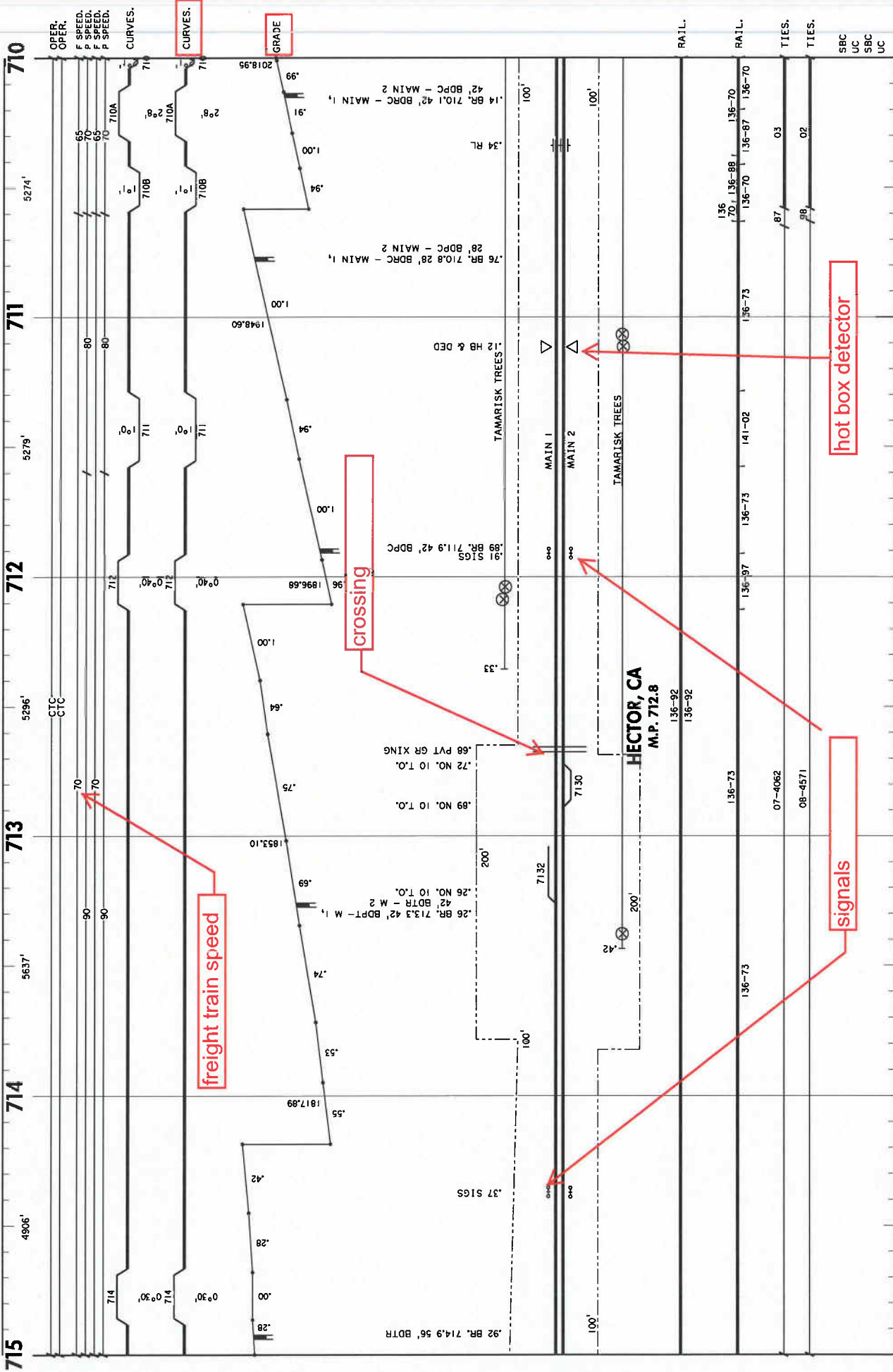




Barstow, CA

## Line Segment 7200

Needles, CA



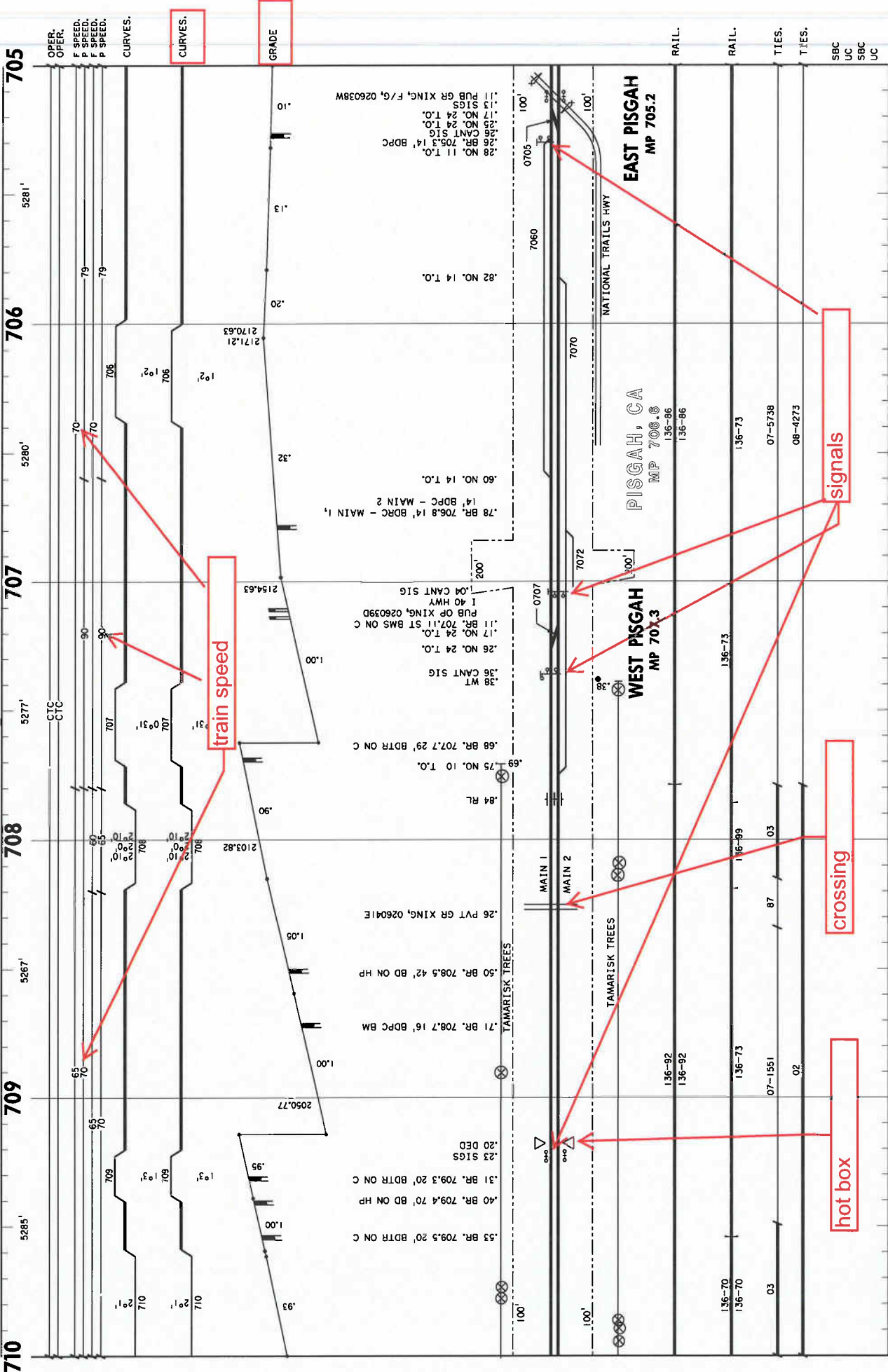
**BNSF Railway Company**

VS = AT CA-31

NEE008.DGN

Revised: 07/13/2009

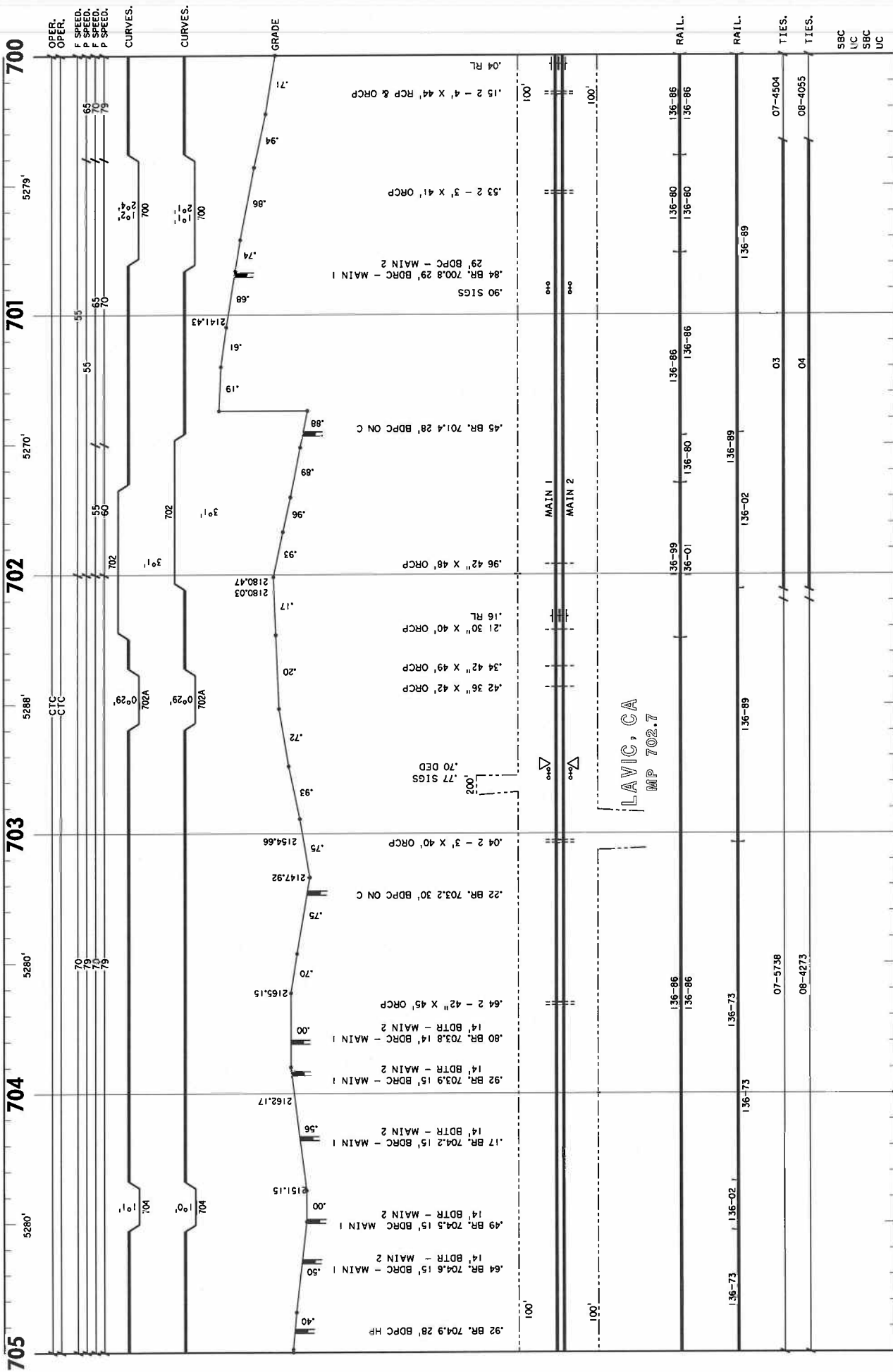
### Needles Subdivision



Barstow, CA

## Line Segment 7200

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**BNSF Railway Company**

VS = AT CA-31

NEE010.DGN

Revised: 07/13/2009

### Needles Subdivision







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**APPLICATION FOR CERTIFICATION**

**For the CALICO SOLAR** (Formerly SES Solar One)

**Docket No. 08-AFC-13**

**PROOF OF SERVICE**  
(Revised 8/9/10)

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**DECLARATION OF SERVICE**

I, Harriet Vletas, declare that on August 17, 2010, I served and filed copies of the attached Prepared Direct Testimony of Dennis Skeels, BNSF Railway Company dated August 17, 2010. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at:  
**[[www.energy.ca.gov/sitingcases/solarone](http://www.energy.ca.gov/sitingcases/solarone)].**

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**CALIFORNIA ENERGY COMMISSION**  
Attn: Docket No. 08-AFC-13  
1516 Ninth Street, MS-4  
Sacramento, CA 95814-5512  
[docket@energy.state.ca.us](mailto:docket@energy.state.ca.us)

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

  
HARRIET VLETAS

\*indicates change



**BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT  
COMMISSION OF THE STATE OF CALIFORNIA  
1516 NINTH STREET, SACRAMENTO, CA 95814  
1-800-822-6228 – WWW.ENERGY.CA.GOV**

**APPLICATION FOR CERTIFICATION**

***For the CALICO SOLAR (Formerly SES Solar One)***

**Docket No. 08-AFC-13**

**PROOF OF SERVICE  
(Revised 8/9/10)**

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### DECLARATION OF SERVICE

I, Ani Seferyan, declare that on October 25, 2010, I served and filed copies of the attached "Attachment E - Exhibit 1204" dated October 25, 2010. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [\[www.energy.ca.gov/sitingcases/solarone\]](http://www.energy.ca.gov/sitingcases/solarone).

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☐ by personal delivery;  
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1516 Ninth Street, MS-4  
Sacramento, CA 95814-5512  
[docket@energy.state.ca.us](mailto:docket@energy.state.ca.us)

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

\_\_\_\_\_  
/s/ Ani Seferyan  
Ani Seferyan

# **STATE OF CALIFORNIA**

## **Energy Resources Conservation And Development Commission**

In the Matter of:  
The Application for Certification  
for the Calico Solar Power Project  
Licensing Case

Docket No. 08-AFC-13

### **INTERVENOR BNSF's COMMENTS ON THE PMPD**



## ATTACHMENTS

A	Exhibit 1200
B	Exhibit 1201
C	Exhibit 1202
D	Exhibit 1203
E	Exhibit 1204
F	Exhibit 1205
G	Exhibit 1206
H	Exhibit 1207
I	Exhibit 1208
J	Exhibit 1209
K	Exhibit 1210
L	Exhibit 1211
M	Exhibit 1212
N	Exhibit 1213
O	Exhibit 1214
P	BNSF Post-Hearing Brief
Q	BNSF Comments and Protests to FEIS
R	BNSF Supplemental Comments and Protests to FEIS
S	Sierra Club's PMPD Comments
T	CURE's PMPD Comments

# STATE OF CALIFORNIA

## Energy Resources Conservation And Development Commission

In the Matter of:  
The Application for Certification  
for the Calico Solar Power Project  
Licensing Case

Docket No. 08-AFC-13

**PREPARED DIRECT TESTIMONY OF DAVID A. KRAUSS, Ph.D.  
Senior Managing Scientist, Exponent**

**and**

**GENEVIEVE M. HECKMAN, Ph.D.  
Senior Scientist, Exponent**

August 16, 2010

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PREPARED DIRECT TESTIMONY

OF

David A. Krauss, Ph.D.

Senior Managing Scientist, Exponent

and

Genevieve M. Heckman

Senior Scientist, Exponent

Q.1 Please state your name and occupation?

A.1 Our names are David A. Krauss, Ph.D. and Genevieve M. Heckman, Ph.D.

Dr. Krauss is a Senior Managing Scientist with Exponent; Dr. Heckman is a Senior Scientist with Exponent. Exponent is a multidisciplinary organization of scientists, physicians, engineers, and regulatory consultants that performs in-depth investigations in more than 90 technical disciplines. Exponent evaluates complex human health and environmental issues, assesses risks related to exposure to certain environmental conditions, and analyzes failures and accidents to determine their causes and to understand how to prevent them. We also evaluate complex human health and environmental issues to find cost-effective solutions.

Q.2 What is your particular area of expertise?

A.2 We have both obtained Ph.D.'s in neuroscience and have specialized knowledge in human perception and cognition, reaction time, attention, the effects of lighting conditions on vision, and how stress affects behavior. We

assess risk associated with and investigate human factors in a wide array of scenarios. A copy of our respective *curriculum vitae* are attached hereto as Exhibits "A" and "B."

Q.3 Have you the studied the impact of glare and glint in your area of expertise?

A.3 Yes. This is typically done to determine the impact, if any, that glare or glint may have on a particular environment or has had on an accident.

Q4 Is there a body of professional literature that discusses and analyzes the effect of glint and glare?

A.4 Yes. There is an extensive body of literature that deals with both the effects of vehicle operators encountering bright lights during operation and the more physiological studies that deal with the changes to the retina when the retina is bombarded with bright light under various states of light adaptation.

Q.5. What have you been asked to do in relation to the Calico Solar Project?

A.5 We were asked to review and have reviewed the Staff Assessment and Supplemental Staff Assessment, Part II, on Traffic and Safety, as it relates to glare and glint, the associated study referenced in Appendix A, and to render an opinion as to the adequacy of the study and conclusions contained therein.

Q.6 After reviewing these materials, did you develop an understanding about the nature and purpose of the Calico Solar Project?

A.6 Yes, we did. As we understand it, this is relatively large solar energy project to be located in the Mojave Desert near Barstow. The proposed Project is to include 34,000 SunCatchers – 40 foot tall, 25-kilowatt-electrical (kWe) solar dishes developed by Stirling Energy Systems. [Supplemental Staff Assessment, Part II ("SSA Part II") at C.11-4];

Q.7 What is your opinion of the adequacy of the Supplemental Staff Assessment and associated study and the conclusions contained therein?

A.6 The Supplemental Staff Assessment, Part II, specifically makes a number of findings, three of which we focus on:

1. the SunCatchers could pose a significant risk to BNSF engineers and train crews, to include but not limited to temporary flash blindness, which would adversely impact the ability to see train signal lights [SSA Part II at C-11-19];
2. train signal lights are significant to the operational safety of the crews and trains [SSA Part II at C-11-19]; and
3. any escaping or itinerant glint and glare that may affect the railroad engineer's ability to clearly and accurately see signals is mitigable through shielding, LED lights, or other means designed to increase the contrast and intensity of the signal light [SSA Part II at C-11-19].

Q.8 What is your opinion of the adequacy of the first finding – the SunCatchers could pose a significant risk to BNSF engineers and train crews, to include but not limited to temporary flash blindness, which would adversely impact the ability to see train signal lights?

A.8 There is sufficient material in the SSA Part II, in particular the study attached as Appendix A ("Daytime Intrusive Brightness Analysis of Stirling Engine Solar Systems, by James Jewell, et al., (hereafter the "Jewell Report") that supports this finding. Although requested, we have not seen and there is not adequate time to review the underlying data associated with the Jewell Report. However, the Jewell Report states that the authors calculated the amount of light that is both captured by and escapes from a single SunCatcher. Based on their calculations, which at this point we assume to be accurate, they found that

"significant glare impacts (temporary flash blindness) would occur to any receptor within 223 feet of any SunCatcher unit." [SSA Part II, Appendix A at A-8] Accordingly, the Jewell Report establishes that at least 223 feet must be maintained between any receptor and any SunCatcher. [See Jewell Report at SSA Part II, Appendix A at A-10 ("At any distance less than 223 feet from the SunCatcher units, construction and operational workers will experience hazardous levels of irradiance.").] The proposed Project, however, does not envision a single SunCatcher; it calls for 34, 000 SunCatchers. Moreover, the Jewell Report is a static evaluation – both the SunCatcher and the receptor are stationary. Here, we have a dynamic situation – we know the engineer will be in a moving train that is not traveling in a straight line. The Jewell Report does not analyze, calculate or measure the impact of thousands of SunCatchers specifically on a train engineer moving over tracks within the Right-of-Way (RoW). The adverse impact, therefore, may be greater than that stated in the Jewell Report.

Q.9 What is your opinion of the adequacy of the second finding – train signal lights are significant to the operational safety of the crews and trains?

A.9 This finding is supported by the SSA and the Jewell Report. Moreover, we have spoken with several personnel from BNSF in order to gain a better perspective of the importance of train signals to BNSF and the actual operators. Based on our discussions, it is clear that being able clearly to see train signals from an appropriate distance given the train's speed (varying between approximately 60-75 mph) and to respond accordingly is critical to the safety of the train and its crew. At these speeds, and depending upon the grade, it is our understanding that it can take over a mile of track to stop a train.

Q.10 What is your opinion of the adequacy of the third finding – any escaping or itinerant glint and glare that may affect the railroad engineer's ability to clearly and accurately see

signals is mitigable through shielding, LED lights, or other means designed to increase the contrast and intensity of the signal light?

A.10 There is no scientific basis for this finding. No study has been performed that addresses these issues. According to the SSA, Part II at C.11-32, "Staff determined that measures exist, if needed, to ensure that BNSF railway engineers will be able to correctly perceive the color of the signal. Those procedures involves hooding and increasing the intensity of the lights." There is no analysis or data that supports this finding. The Jewell Report makes no mention of shielding, LED lights or other measures to increase the contrast and intensity of signal lights. While various mitigation measures may be helpful to reduce the impact of the glint and glare from the SunCatchers, to date no site-specific studies have been done to verify which measures, if any, would be able to mitigate the hazards identified in the above two findings. To reiterate, the Jewell Report is a static analysis of a single SunCatcher and a single receptor. Here, we have a dynamic situation and, to date, there has been no study or analysis to evaluate an engineer's ability to see a signal under such conditions.

Q.11 In your opinion, what needs to be done to properly assess the impact of glint and glare from the SunCatchers?

A.11 In addition to modeling the impact from a single SunCatcher, to fully evaluate this dynamic situation, the following factors, among others, need to be analyzed, measured and/or calculated:

1. The engineer's vantage point changes with respect to the location of SunCatchers in his visual field and the number of SunCatchers in his visual field as the engineer travels along the RoW;

2. The magnitude of glare may be affected by the geometry of the track, the changes in elevation, and the direction of travel;
3. The pattern of glare may have a differential effect on engineers depending on the time of day;
4. The pattern of glare may have a differential effect on engineers depending on the time of year;
5. There also may exist a level of glare that engineers may experience as a result of the SunCatchers that does not rise to a level that would induce the temporary flash blindness measured by the Jewell Report, but nonetheless causes discomfort that makes it difficult to focus in the direction of the SunCatchers;
6. While mitigation measures, including high contrast LED lights or black shielding, were suggested to enhance the conspicuity of railroad signals, the ability for engineers to perceive these signals out of a potentially bright, dynamically changing background has not been assessed to understand any possible discomfort or delays in detection that might arise out of the signal being viewed against a field of SunCatchers;
7. The perceived glint (high-contrast flicker) in the engineers' peripheral visual field may cause engineers involuntarily to orient their eyes and attention away from where they would otherwise be focusing their vision;
8. The size of the SunCatchers (up to 40 feet tall) may cause visual obstructions, independent of glare, that prevent engineers from perceiving job-critical information;



9. Light reflecting off the SunCatchers may result in a phenomenon known as a “phantom signal” whereby unlit signals appear to be illuminated because of abundant light striking them at low angles;
10. Since the trains are moving through the RoW, the distance traveled during expected look-away times as a result of the SunCatchers’ presence should be calculated and the consequences of such travel should be assessed;
11. The effects of viewing multiple, indeed thousands, of SunCatchers simultaneously, rather than just one, must be analyzed to understand any cumulative glare effects that may arise;
12. The effects of viewing multiple SunCatchers simultaneously, for the entire period of time that the engineer is passing through the RoW, must be analyzed to understand any cumulative glare effects that may arise over time.

Q.12 The SSA Part II refers to “temporary flash blindness,” (see, e.g., SSA Part II at C.11-19). Is this the only condition that could impair a train engineer's ability to see a signal and react in a timely manner?

A.12 No. In addition to temporary flash blindness, the Jewell Report refers to veiling reflections and/or distracting glare. [See SSA Part II, Appendix A at A-7.] Again, while the Jewell Report appears to account for temporary flash blindness from a single SunCatcher with a single receptor at a fixed point, it does not measure or otherwise account for the situation we have here, which involves multiple SunCatchers (i.e., thousands) at different elevations and different angles in a dynamic, moving scenario. This needs to be fully analyzed before one can render an opinion as to whether or not the 223-foot setback necessary for a single SunCatcher is sufficient for multiple SunCatchers.

Moreover, veiling effects and/or distracting glare are clearly noted in the Jewell Report as phenomena that are expected to occur as a result of light emitted from the SunCatcher. As the Jewell Report notes, it is well known that veiling reflections and/or distracting glare impact receptors "[b]eyond the distance that may cause temporary flash blindness [i.e., beyond 223 feet] and "may cause nuisance distraction or veil other objects (e.g., signal indicators for train operators) in the visual field." [SSA Part II, Appendix A at A-7.] In short, even with a single SunCatcher, the veiling reflection and/or distracting glare from the single SunCatcher may cause a disturbance in the train engineer's visual field such that the engineer cannot see the signal. The SSA Part II does not even mention these phenomena or otherwise attempt to account for them. The Jewell Report recognizes these phenomena but has done nothing to measure or quantify their impact. Moreover, as with temporary flash blindness, the Jewell report fails to account for, analyze, or measure the cumulative effect of thousands of SunCatchers on veiling reflections and/or distracting glare at different heights and angles in a dynamic, moving scenario.

Q.13 Have you reviewed TRANS-7 in the SSA Part II and do you have an opinion regarding whether it will adequately address the significant safety issues regarding the impact of glint and glare on train operators?

A.13 Yes. There is a discussion of TRANS-7 at C.11-19 and the actual proposed Condition of Certification is set forth at C.11-36-39 and is divided into two parts, "Signal Light Modifications," and "General Location, Operating, and Reporting Procedures." During the discussion on C.11-19, Staff notes that glare and glint is "mitigable" and that TRANS-7 is "designed to reduce to less than significant the operational impacts of the SunCatchers ... to BNSF Railway and AMTRAK crews and

passengers." The scientific analysis performed in the Jewell Report is insufficient to support this conclusion or the separate or collective potential, and as yet untested, mitigation measures suggested therein. For example, the Signal Light Modifications section assumes without any analysis or study that signals can be modified by affixing shields and/or utilizing what is referred to as "current LED signal technology." Without more information there is simply no basis for this assumption. The Jewell Report itself has no such reference to signal light modification, shielding, or "current LED signal technology." The General Location, Operating, and Reporting Procedures section sets forth numerous requirements regarding offset tracking procedures and stow positions. While there is reference to offset tracking and stow positions in the Jewell Report (e.g., the reference to modifying offset tracking from 10 degrees to 25 degrees [SSA Part II, Appendix A-11]), there is no accompanying calculation to establish the sufficiency of this proposed offset. Additionally, the Jewell Report is based on a single SunCatcher and a single receptor; it does not take into account the dynamic situation here. With thousands of SunCatchers at different elevations and a train moving along a curved track for several miles, the view of the engineer and the angle between the engineer and the respective SunCatchers will change constantly. This has not been quantified or otherwise taken into account. Not until the full effects of the SunCatchers' field are studied and determined, is one able to propose, evaluate, and select potential mitigation measures.

Q.14 Did you prepare any demonstratives to illustrate some of these concepts?

A.14 Yes.


Q.15 Please explain how these relate to the present discussion.

A.15 Exhibits 1-2 demonstrate an important concept in visual search – that is, that the background against which a target (in this case, the upward tilted line) is viewed


has a significant and measurable impact on the ease with which that target is located. Exhibit 3 illustrates the "phantom signal" phenomenon, in which direct external illumination can hinder a driver or operator's ability to discern whether a signal light is illuminated. Finally, Exhibit 4 depicts a simple demonstration of the spatial summation of light.

I swear under penalty of perjury that this testimony is true and correct to the best of my knowledge and belief.

Dated: August 16, 2010



David A. Krauss, Ph.D.



Genevieve M. Heckman, Ph.D.

**David A. Krauss, Ph.D.**  
**Senior Managing Scientist**

**Professional Profile**

Dr. David A. Krauss is a Senior Managing Scientist in Exponent's Human Factors practice. Dr. Krauss has specialized knowledge in human perception and cognition, reaction time, attention, the effects of lighting conditions on vision, and how stress affects behavior. He uses this experience to investigate human factors in a wide array of scenarios such as automobile accidents, industrial and occupational accidents, structure fires, and slip-and-fall incidents. Dr. Krauss has investigated accidents associated with industrial safety, motor vehicles, and consumer products, among others.

Dr. Krauss' analysis methods include programming custom image-processing software to quantify visibility and conspicuity for many applications, including product development and recreating accident scenarios. He has also developed, published, and implemented a method to accurately capture and display digital photographs of low-visibility or nighttime accident scenes. Additionally, he performs quantitative injury and risk analyses using large-scale incident and injury data from various sources including the Consumer Product Safety Commission (CPSC), Centers for Disease Control (CDC), Food and Drug Administration (FDA), and manufacturer trade associations.

As part of his consulting practice, Dr. Krauss oversees human-subject testing to assess product usability and to gather user opinions for various products. He incorporates elements of anthropometry, visual assessments, psychophysics, questionnaires, and observational techniques to conduct comprehensive evaluations of a variety of consumer and industrial products.

Dr. Krauss' doctoral dissertation addressed human visual perception and reading. His familiarity with the cognitive-psychology literature has been applied to the development of warnings, instructions, and safety information for various products as well as to the assessment of the role of warnings in accidents.

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Undergraduate honors, University of Michigan (1994)

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## **Publications**

Khan F, Arndt S, Krauss D. Understanding the relationship between safety climate and warning compliance in occupational settings. Proceedings, 14<sup>th</sup> Annual International Conference on Industrial Engineering: Theory, Applications and Practice, Anaheim, CA, 2009.

Polk TA, Lacey HP, Nelson JK, Demiralp E, Newman LI, Krauss D, Raheja A, Farah MJ. The development of abstract letter representations for reading: Evidence for the role of context. *Cognitive Neuropsychology* 2009; 26(1):70–90.

Kubose T, Krauss D. Methodological considerations for using the English XL tribometer for post-hoc slip-and-fall evaluations. Proceedings, 52<sup>nd</sup> Annual Meeting of the Human Factors and Ergonomics Society, Santa Monica, CA, 2008.

Krauss D, Arndt S, Lakhiani S, Khan F. Additional considerations when applying the “Safety Engineering Hierarchy” in industrial work settings. Proceedings, 13<sup>th</sup> Annual International Conference on Industrial Engineering: Theory, Applications and Practice, Las Vegas, NV, 2008.

Arndt S, Krauss D, Weaver B. A previously unidentified failure mode for ladder-climbing fall-protection systems. Proceedings, American Society of Safety Engineers Professional Development Conference and Exposition, Las Vegas, NV, 2008.

Arndt S, Young D, Krauss D. Human factors issues in trucking—What does a qualified expert need to know? Trucking Law Seminar, Phoenix, AZ, April 17, 2008.

Krauss D, Lieberman D, Grossman H, Ray R, Scher I. An evaluation of perceptual experience of skiers using quantitative image processing. *Journal of ASTM International* 2008; 5(4).

Kuzel M, Krauss D, Moralde M, Kubose T. Comparison of subjective ratings of slipperiness to the measured slip resistance of real-world walking surfaces. International Conference on Slips, Trips and Falls, From Research to Practice, 2007.

Krauss DA, Kuzel MJ, Cassidy P, Goodman J. A review of technologies for studying visual perception under low-illumination conditions. Proceedings, 50<sup>th</sup> Annual Meeting of the Human Factors and Ergonomics Society, Santa Monica, CA, 2006.

Arndt SR, Wood CT, Delahunt PB, Wall CT, Krauss DA. Who’s in the back seat? A study of driver inattention. Proceedings, 50<sup>th</sup> Annual Meeting of the Human Factors and Ergonomics Society, Santa Monica, CA, 2006.

Krauss DA, Kuzel MJ, Arndt SR, Delahunt PB. Validation of digital image representations of low-illumination scenes. SAE Paper 2006-01-1288, Society for Automotive Engineers, Inc., 2006.

Young D, Huntley-Fenner G, Trachtman D, Krauss D. Human performance issues in auditory collision-avoidance systems. Proceedings, 10<sup>th</sup> Annual International Conference on Industrial Engineering—Theory, Applications and Practice, pp. 64–68, Clearwater, FL, 2005.

Al-Tarawneh IS, Cohen WJ, Trachtman D, Bishu RR, Krauss DA. The effect of hands-free cellular telephone conversation complexity on choice response time in a detection task. Proceedings, 48<sup>th</sup> Annual Meeting of the Human Factors and Ergonomics Society, Santa Monica, CA, 2004.

Krauss DA. Mechanisms of letter perception. Doctoral Dissertation, Department of Psychology, University of California, Los Angeles, June 2003.

### **Presentations and Posters**

Clausner TC, Fox JR, Krauss DA. Comprehension and production of graphs that metaphorically express linguistic semantic event structure. 8<sup>th</sup> International Cognitive Linguistics Conference, La Rioja, Spain, 2003.

Krauss DA, Engel SA. Effects of stimulus crowding in human extrastriate cortex. Meeting of the Society for Neuroscience, San Diego, CA, 2001.

Krauss DA, Engel SA. Differential effects of crowding on feature detection and letter recognition. Meeting of the Cognitive Neuroscience Society, New York, NY, 2001.

Krauss DA, Engel SA. Perceptual learning in color classification. Meeting of the Association for Research in Vision and Ophthalmology, Fort Lauderdale, FL, 2000.

Polk TA, Krauss D, Nelson J, Pond H, Raheja A, Farah MJ. The development of abstract letter identities: Evidence for a contextual hypothesis. Annual Meeting of the Psychonomics Society, 1998.

### **Project Experience**

Evaluated the visibility of pedestrians, tractor-trailer combinations, and other parked vehicles on roadways under various reduced-lighting conditions.

Analyzed the performance capabilities, including perception-response time, for drivers and pedestrians under a variety of lighting and traffic conditions.

Created representative low-light photographs to use as demonstrative exhibits using recently developed and validated software and photography techniques.

Used the English XL tribometer to evaluate slip resistance on various flooring surfaces and correlated these measurements with pedestrian expectations of surface traction.

Programmed custom software in Matlab<sup>®</sup> to assess the visibility of terrain on a ski mountain under a variety of lighting conditions. These measurements were correlated with skier and

snowboarder subjective ratings to understand perceptual biases to aid in predicting potentially hazardous visibility conditions.

Assisted companies with development and revision of product warnings and instructions for a wide range of products including those used in home, occupational, recreational, and agricultural settings.

### **Academic Appointments**

- Lecturer, University of California, Los Angeles Department of Psychology
- Instructor, University of California, Los Angeles Extension

### **Peer Reviewer**

- Human Factors and Ergonomics Society
- Worth Publishers

### **Professional Affiliations**

- Human Factors and Ergonomics Society (member)
- Society for Automotive Engineers (member)



**Genevieve M. Heckman, Ph.D.**  
**Senior Scientist**

**Professional Profile**

Dr. Genevieve Heckman is a Senior Scientist in Exponent's Human Factors practice. Dr. Heckman has specialized expertise in human perception and cognition, reaction time, and decision-making, as well as lighting and illumination, inattention and distraction, and the effects of training and experience on performance. Dr. Heckman uses her knowledge of fundamental human sensory and cognitive processes to evaluate human factors and human performance issues in a wide variety of scenarios including trips, slips, and falls; motor vehicle and pedestrian accidents; occupational and industrial accidents; on-product warnings and safety information; child safety and hazards; and the use and misuse of consumer products. She has experience conducting visibility and conspicuity analyses; evaluating optical radiation hazards in industrial settings; and assessing the factors influencing driver and pedestrian behavior, reaction time, performance in sports and recreation, and compliance with warnings and instructions. In her work, Dr. Heckman uses a variety of analysis methods, including human subjects testing, quantitative injury and risk analyses, and use of image-processing techniques to quantify visibility, conspicuity, and discriminability under diverse viewing conditions.

Prior to joining Exponent, Dr. Heckman completed a Ph.D. in psychology, with specialization in cognitive neuroscience, at the University of California, Los Angeles. Her work during that time used a combination of behavioral, neuroimaging, and mathematical techniques to study human perception of color and lighting, the effects of experience on perceptual capabilities, and optimal experimental design in fMRI experiments. Her graduate work was supported by awards from the University of California, the National Institutes of Health, and the National Science Foundation.

**Academic Credentials and Professional Honors**

Ph.D., Psychology/Cognitive Neuroscience, University of California, Los Angeles, 2007  
M.A., Psychology/Cognitive Neuroscience, University of California, Los Angeles, 2004  
B.A., Psychology, Wake Forest University, 2002

Hobson Dissertation Year Fellow, University of California, Los Angeles, 2006; National Science Foundation Graduate Research Fellow, University of California, Los Angeles, 2003–2006; Phi Beta Kappa Honor Society, Wake Forest University, 2002

## **Publications**

Heckman GM, Jackson GW, Keefer RE, Ray R, Harley EM, Young DE. Mechanisms of automatic transmission console shift selection and driver egress. Society of Automotive Engineers 2009 World Congress, April 2009. Paper judged to be among the most outstanding SAE Technical Papers of 2009 and thus further published in the SAE International Journal of Engines, Volume 2, September 15, 2009.

Harley EM, Trachtman D, Heckman GM, Young DE. Driver gear-shifting behaviors and errors. Proceedings, Human Factors and Ergonomics Society, 52nd Annual Meeting, New York, NY, 2008.

Heckman GM, Bouvier SE, Carr VA, Harley EM, Cardinal KS, Engel SA. Nonlinearities in rapid event-related fMRI explained by stimulus scaling. *Neuroimage* 2007; 34:651–660.

Heckman GM, Muday JA, Schirillo JA. Chromatic shadow compatibility and cone-excitation ratios. *Journal of the Optical Society of America A* 2005; 22:401–415.

## **Presentations and Published Abstracts**

Heckman GM. Mechanisms of learning in a color detection task. Invited talk given at the Smith-Kettlewell Eye Research Institute Colloquium Series, San Francisco, CA, November 2006.

Heckman GM, Engel SA. Perceptual learning of contrast detection is color selective. Poster session presented at the annual meeting of the Vision Sciences Society, Sarasota, FL, May 2006.

Harley EM, Bouvier SE, Heckman GM, Engel SA. Figure-ground effects in V1 measured with functional MRI. Poster session presented at the annual meeting of the Vision Sciences Society, Sarasota, FL, May 2006.

Heckman GM, Cardinal KS, Harley EM, Bouvier SE, Carr VA, Engel SA. Characterizing contrast response functions measured with rapid event-related fMRI. Poster session presented at the annual meeting of the Vision Sciences Society, Sarasota, FL, May 2005.

Cardinal KS, Harley EM, Heckman GM, Bouvier SE, Carr VA, Engel SA. Comparison of contrast response functions measured with rapid and spaced event-related fMRI. Poster session presented at the annual meeting of the Society for Neuroscience, San Diego, CA, October 2004.

Heckman GM, Engel SA. Spatial frequency modulates color selectivity of adaptation to contrast patterns. Poster session presented at the annual meeting of the Vision Sciences Society, Sarasota, FL, May 2003.

Schirillo JA, Heckman GM, Barra T. A chromatic test of shadow compatibility and equal cone excitation ratios. Poster session presented at the annual meeting for the Vision Sciences Society, Sarasota, FL, May 2003.

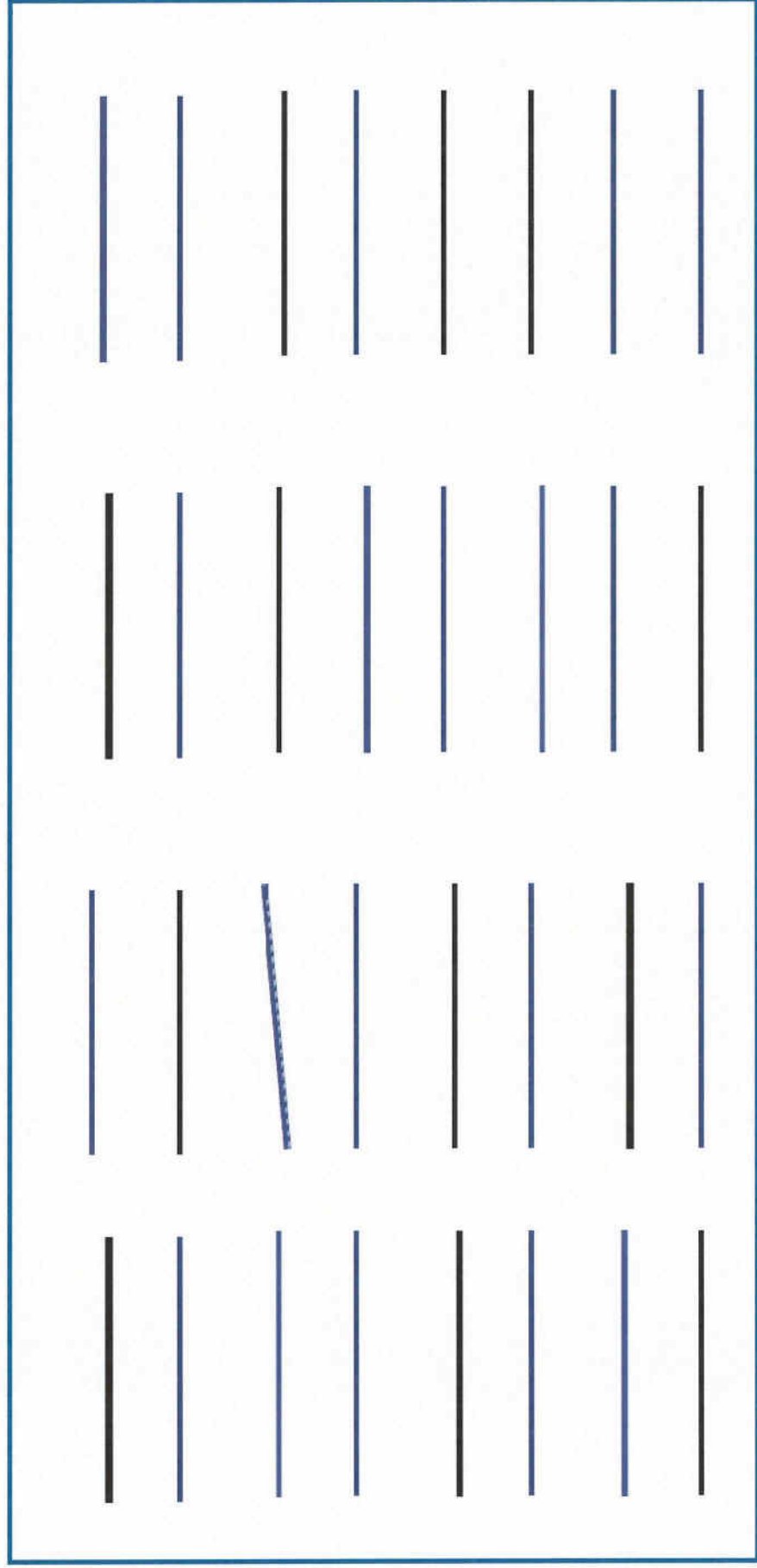
### **Peer Reviewer**

- Human Factors and Ergonomics Society

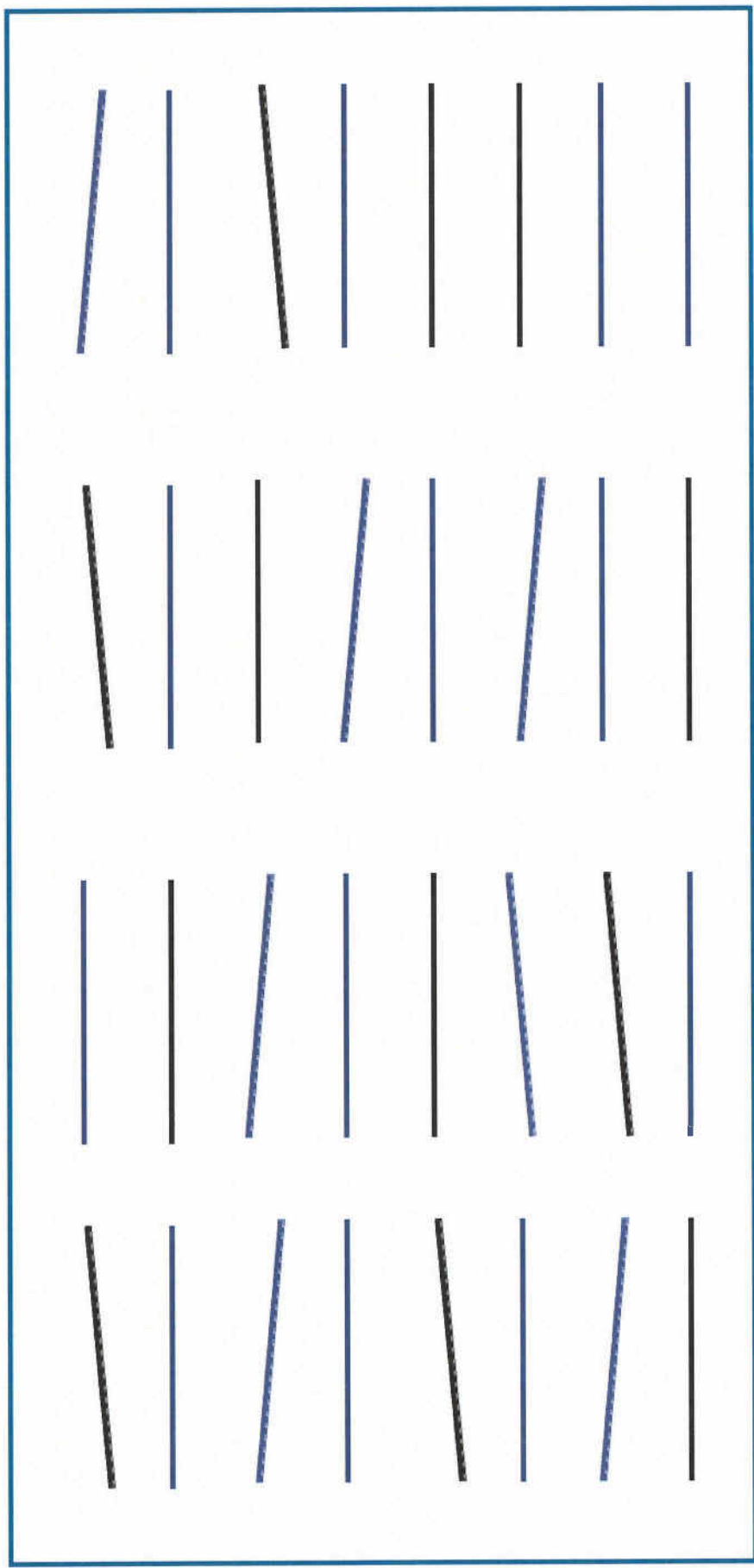
### **Professional Affiliations**

- Human Factors and Ergonomics Society
- Vision Sciences Society

Visual Search:  
Find the upward tilted purple line



Visual Search:  
Find the same upward tilted purple line

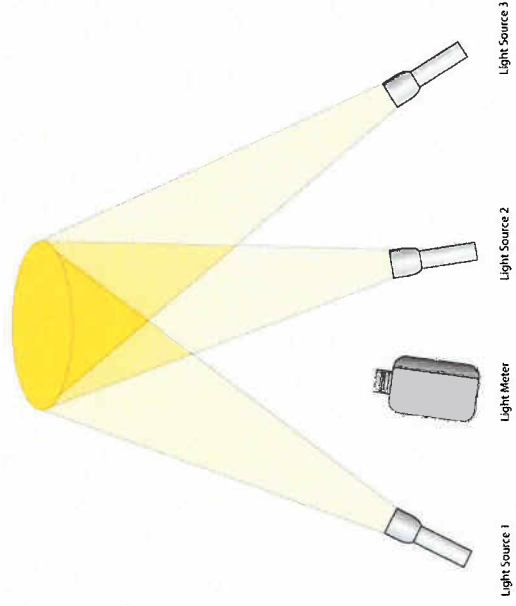
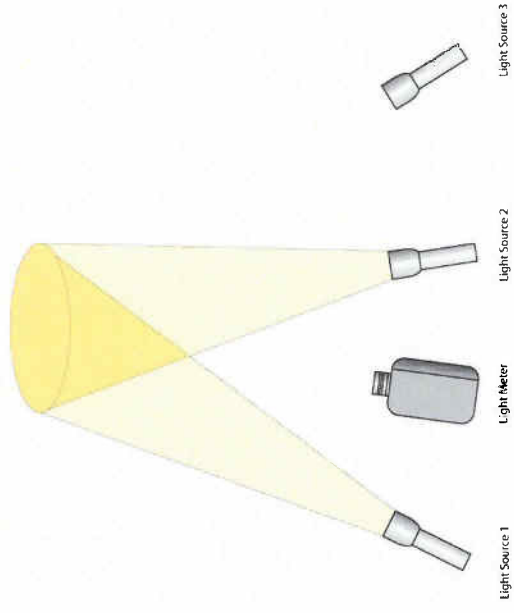
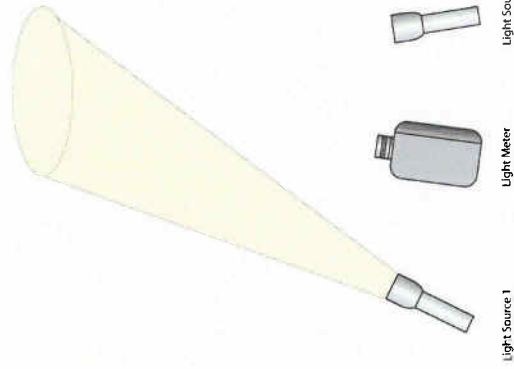


# “Phantom Signals”

Excess of direct external illumination on a signal makes it difficult to discern which signal is illuminated.



# Spatial Summation of Light







BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT  
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1-800-822-6228 – WWW.ENERGY.CA.GOV

**APPLICATION FOR CERTIFICATION**

**For the CALICO SOLAR** (Formerly SES Solar One)

**Docket No. 08-AFC-13**

**PROOF OF SERVICE**  
(Revised 8/9/10)

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### DECLARATION OF SERVICE

I, Harriet Vletas, declare that on August 17, 2010, I served and filed copies of the attached Prepared Direct Testimony of David A. Krauss, Ph.D and Genevieve M. Heckman, Ph.D. dated August 16, 2010. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at:  
[www.energy.ca.gov/sitingcases/solarone].

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

*(Check all that Apply)*

#### FOR SERVICE TO ALL OTHER PARTIES:

- ☒ sent electronically to all email addresses on the Proof of Service list;
- ☐ by personal delivery;
- ☐ by delivering on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses NOT marked "email preferred."

**AND**

#### FOR FILING WITH THE ENERGY COMMISSION:

- ☒ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (*preferred method*);

**OR**

- ☐ depositing in the mail an original and 12 paper copies, as follows:

**CALIFORNIA ENERGY COMMISSION**  
Attn: Docket No. 08-AFC-13  
1516 Ninth Street, MS-4  
Sacramento, CA 95814-5512  
docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

  
HARRIET VLETAS



**BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT  
COMMISSION OF THE STATE OF CALIFORNIA  
1516 NINTH STREET, SACRAMENTO, CA 95814  
1-800-822-6228 – WWW.ENERGY.CA.GOV**

**APPLICATION FOR CERTIFICATION**

***For the CALICO SOLAR (Formerly SES Solar One)***

**Docket No. 08-AFC-13**

**PROOF OF SERVICE  
(Revised 8/9/10)**

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## ENERGY COMMISSION

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### DECLARATION OF SERVICE

I, Ani Seferyan, declare that on October 25, 2010, I served and filed copies of the attached "Attachment F - Exhibit 1205" dated October 25, 2010. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [\[www.energy.ca.gov/sitingcases/solarone\]](http://www.energy.ca.gov/sitingcases/solarone).

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

*(Check all that Apply)*

#### FOR SERVICE TO ALL OTHER PARTIES:

- ☒ sent electronically to all email addresses on the Proof of Service list;
- ☐ by personal delivery;
- ☐ by delivering on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses **NOT** marked "email preferred."

**AND**

#### FOR FILING WITH THE ENERGY COMMISSION:

- ☒ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (*preferred method*);

**OR**

- ☐ depositing in the mail an original and 12 paper copies, as follows:

#### **CALIFORNIA ENERGY COMMISSION**

Attn: Docket No. 08-AFC-13  
1516 Ninth Street, MS-4  
Sacramento, CA 95814-5512  
[docket@energy.state.ca.us](mailto:docket@energy.state.ca.us)

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

\_\_\_\_\_  
/s/ Ani Seferyan  
Ani Seferyan

# **STATE OF CALIFORNIA**

## **Energy Resources Conservation And Development Commission**

In the Matter of:  
The Application for Certification  
for the Calico Solar Power Project  
Licensing Case

Docket No. 08-AFC-13

### **INTERVENOR BNSF's COMMENTS ON THE PMPD**

## ATTACHMENTS

A	Exhibit 1200
B	Exhibit 1201
C	Exhibit 1202
D	Exhibit 1203
E	Exhibit 1204
F	Exhibit 1205
G	Exhibit 1206
H	Exhibit 1207
I	Exhibit 1208
J	Exhibit 1209
K	Exhibit 1210
L	Exhibit 1211
M	Exhibit 1212
N	Exhibit 1213
O	Exhibit 1214
P	BNSF Post-Hearing Brief
Q	BNSF Comments and Protests to FEIS
R	BNSF Supplemental Comments and Protests to FEIS
S	Sierra Club's PMPD Comments
T	CURE's PMPD Comments

# **STATE OF CALIFORNIA**

## **Energy Resources Conservation And Development Commission**

In the Matter of:  
The Application for Certification  
for the Calico Solar Power Project  
Licensing Case

Docket No. 08-AFC-13

### **PREPARED DIRECT TESTIMONY OF EDWARD P. PHILLIPS BNSF RAILWAY COMPANY**

August 17, 2010

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PREPARED DIRECT TESTIMONY

OF

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Q.1 Please state your name and occupation?

A.1 My name is Edward P. Phillips. I am the Manager of Environmental Operations for the California Division of BNSF Railway Company ("BNSF"). I am based in San Bernardino, California. My resume was attached to my earlier testimony.

Q.2 What is the purpose of your testimony in this proceeding?

A.2 I will testify regarding access issues raised in the SSA, Part II, Traffic and Transportation.

Q.3 Why does BNSF have concerns regarding the Calico Solar Project?

A.3 BNSF is one of two Class 1 railroads operating in California. BNSF's transcontinental mainline, traversed by as many as 80 trains per day, carries interstate commerce from the Ports of Los Angeles and Long Beach to U.S. Midwestern, Southwestern and Eastern markets. BNSF's mainline has operated through the section of the Mojave Desert, where Calico Solar has now proposed its Project, since the late 19<sup>th</sup> Century. The proposed Project, comprised of 34,000 solar dishes (SunCatchers), transmission line upgrades, detention basins, etc., would surround both sides of approximately 5 miles of BNSF's mainline tracks. Accordingly,

BNSF has significant concerns that the construction and operation of the Project do not adversely impact BNSF operations or otherwise impose unacceptable safety risks to BNSF personnel and operations. An adverse impact to rail traffic by Project construction or operations could have a devastating impact on interstate commerce and portions of this nation's economy. BNSF carries transcontinental shipments of, *inter alia* coal, grains and merchandise for everything from UPS to major retailers. BNSF trains currently run approximately every fifteen minutes in both directions and extend for over a mile in length. Because of the critical nature of the role of BNSF's mainline in interstate commerce, BNSF must maintain complete and unimpeded access to and use of its Right of Way ("RoW").

The consummation of the Project would require the granting of several licenses and permits from BNSF, which Applicant Calico Solar ("Calico Solar") has requested in a piecemeal fashion over the course of the past year. To date, only preliminary access agreements have been granted, including a permit to survey and a permit to use the RoW crossing at Hector Road. Before BNSF can grant such licenses and permits, BNSF must be assured that its significant safety and operational concerns are addressed.

Q.4 What are the access issues BNSF is concerned about in relation to the Calico Solar Project?

A.4 First, BNSF has been discussing various aspects of access with Calico Solar for some time. During all discussions, BNSF has made it clear that BNSF must maintain complete and unimpeded access to and use of its RoW and that any grant of access by BNSF to Calico Solar will be predicated first, on Calico Solar addressing BNSF's safety and operations concerns to BNSF's requirements and second, on Calico Solar obtaining all the appropriate and required permits and compliance with all applicable laws, ordinances, regulations and statutes. To date, significant concerns raised by BNSF have neither been studied nor addressed, e.g. the impact of glint/glare on railroad signals. Similarly, based upon information provided in the SSA Part II, Traffic and Transportation section, CEC Staff has proposed conditions, e.g. a paved roadway on BNSF's RoW, the impact of which has not been evaluated and it is unlikely that all required and appropriate permits in compliance with all applicable laws, ordinances, regulations and statutes can be achieved in the required time frames.

Second, as noted above, while there have been discussions between BNSF and Calico Solar related to Calico Solar having access to the BNSF RoW, only limited access has been granted to date. Significantly, the current access proposal set forth in SSA Part II at C.11-6 through C.11-18 and TRANS-1 is inconsistent with those discussions and, moreover, is inconsistent with Calico Solar's most recent proposal for access roads on the Project site as depicted in Figure No. 1-1, Phase 1a Project Features

Calico Solar, dated August 12, 2010 ("Figure No. 1-1"). BNSF Railway concluded and advised Calico Solar that the proposed construction activity would obstruct the use of its RoW for critical railroad operations and that they would not grant such a license. Since that time, BNSF and Calico Solar have been engaged in a discussion to determine the feasibility of the proposal reflected in Calico Solar's design dated August 12, 2010 ("Figure No. 1-1"). That design proposes a 2-3 month very limited use of the existing Maintenance of Way ("MoW") graded, dirt road on the northern side of BNSF's RoW, east of Hector Road, to permit Calico Solar to commence surveying, relocating tortoises and placing exclusionary fences. Concurrent with this use, Calico Solar would construct the permanent roadway along its property south of the RoW and BNSF would construct a temporary at-grade crossing to connect to the permanent road. The temporary at-grade crossing would be utilized until approximately October 1, 2011, when Calico Solar's proposed bridge-grade crossing over the BNSF RoW would be completed. The feasibility and terms of this approach are still being discussed between the parties. Once the bridge was built, Calico Solar would no longer utilize either of the at-grade crossings.

Third, building a permanent, two-lane asphalt road with culverts and gutters along either the north side of the RoW east of Hector Road or the south side of the RoW west of Hector Road, for a distance in excess of several miles, was never discussed. The proposed paved roads would

cross several ephemeral streams, and permit the use of the road by over one to two hundred vehicles per day during the construction period. BNSF Railway believes that this proposed use may constitute a project under California's Environmental Quality Act (CEQA), and at a minimum, would require consultation with the U.S. Army Corps of Engineers to determine the jurisdictional nature of the ephemeral streams and potential Clean Water Act Section 404 Dredge and Fill permitting authority, similar consultation with the California Department of Fish and Game for potential state jurisdiction and Fish and Game Code Section 1602 Streambed Alteration Agreement authority, and either the California State Water Resources Control Board or Regional Water Quality Control Board for potential Clean Water Act Section 401 Certification. BNSF Railway also believes that the proposed road project would, due to its size, require a Construction General Permit to adequately cover the construction activities during the build-out of the road as required by California's Porter-Cologne Water Act. BNSF Railway believes that, as the land owner, such a permit would, by its regulatory requirement, encumber BNSF as a responsible party to this permit activity. BNSF has neither fully evaluated nor consented to these requirements. BNSF has discussed the possibility of using a class 2 base on the proposed road on the southern side of the RoW, west of Hector Road.

Fourth, as noted above, we never discussed a paved road within the RoW. We were always talking about minimal impacts to the RoW. Asphalt

roads change the runoff coefficient of the land surface during rain events, change the natural drainage patterns of cross-directional run-on, and may impact BNSF Railway's track infrastructure significantly due to both the road runoff itself and the proposed drainage systems' focused flow patterns. BNSF Railway believes that this proposed road project warrants a hydrology study to determine the potential impacts to the railroad infrastructure. BNSF Railway believes that the proposed road project may also impact desert tortoise habitat and mobility in the immediate area. BNSF Railway believes that at a minimum, consultation with U.S. Fish and Wildlife and U.S. Bureau of Land Management is warranted on this potential impact.

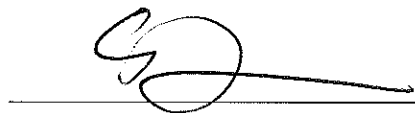
These are the primary issues we were able to identify within the short time period of time that was provided to us.

Q.5 Does this complete your direct testimony?

A.5 Yes, it does.

I swear under penalty of perjury that this testimony is true and correct to the best of my knowledge and belief.

Dated: August 17, 2010

A handwritten signature in black ink, consisting of a stylized 'E' followed by a long horizontal stroke.

Edward P. Phillips



BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT  
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1516 NINTH STREET, SACRAMENTO, CA 95814  
1-800-822-6228 – WWW.ENERGY.CA.GOV

**APPLICATION FOR CERTIFICATION**

***For the CALICO SOLAR (Formerly SES Solar One)***

**Docket No. 08-AFC-13**

**PROOF OF SERVICE**  
***(Revised 8/9/10)***

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### DECLARATION OF SERVICE

I, Harriet Vletas, declare that on August 17, 2010, I served and filed copies of the attached Prepared Direct Testimony of Edward P. Phillips, BNSF Railway Company dated August 17, 2010. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at:  
[www.energy.ca.gov/sitingcases/solarone].

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

*(Check all that Apply)*

#### FOR SERVICE TO ALL OTHER PARTIES:

- ☒ sent electronically to all email addresses on the Proof of Service list;
- ☐ by personal delivery;
- ☐ by delivering on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses **NOT** marked "email preferred."

**AND**

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**OR**

- ☐ depositing in the mail an original and 12 paper copies, as follows:

**CALIFORNIA ENERGY COMMISSION**  
Attn: Docket No. 08-AFC-13  
1516 Ninth Street, MS-4  
Sacramento, CA 95814-5512  
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I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

  
HARRIET VLETAS

\*indicates change



**BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT  
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**APPLICATION FOR CERTIFICATION**

***For the CALICO SOLAR (Formerly SES Solar One)***

**Docket No. 08-AFC-13**

**PROOF OF SERVICE  
(Revised 8/9/10)**

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### DECLARATION OF SERVICE

I, Ani Seferyan, declare that on October 25, 2010, I served and filed copies of the attached "Attachment G - Exhibit 1206" dated October 25, 2010. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [\[www.energy.ca.gov/sitingcases/solarone\]](http://www.energy.ca.gov/sitingcases/solarone).

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

*(Check all that Apply)*

#### FOR SERVICE TO ALL OTHER PARTIES:

- ☒ sent electronically to all email addresses on the Proof of Service list;  
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☐ by delivering on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses **NOT** marked "email preferred."

**AND**

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- ☐ depositing in the mail an original and 12 paper copies, as follows:

#### **CALIFORNIA ENERGY COMMISSION**

Attn: Docket No. 08-AFC-13  
1516 Ninth Street, MS-4  
Sacramento, CA 95814-5512  
[docket@energy.state.ca.us](mailto:docket@energy.state.ca.us)

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

\_\_\_\_\_  
/s/ Ani Seferyan  
Ani Seferyan

# **STATE OF CALIFORNIA**

## **Energy Resources Conservation And Development Commission**

In the Matter of:  
The Application for Certification  
for the Calico Solar Power Project  
Licensing Case

Docket No. 08-AFC-13

### **INTERVENOR BNSF's COMMENTS ON THE PMPD**

## ATTACHMENTS

A	Exhibit 1200
B	Exhibit 1201
C	Exhibit 1202
D	Exhibit 1203
E	Exhibit 1204
F	Exhibit 1205
G	Exhibit 1206
H	Exhibit 1207
I	Exhibit 1208
J	Exhibit 1209
K	Exhibit 1210
L	Exhibit 1211
M	Exhibit 1212
N	Exhibit 1213
O	Exhibit 1214
P	BNSF Post-Hearing Brief
Q	BNSF Comments and Protests to FEIS
R	BNSF Supplemental Comments and Protests to FEIS
S	Sierra Club's PMPD Comments
T	CURE's PMPD Comments



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July 1, 2010

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**Re: Comments on Calico Solar Project SA/DEIS**

Dear Sirs:

BNSF Railway (BNSF) appreciates the opportunity to comment on the Staff Assessment and Draft Environmental Impact Statement ("SA/DEIS") for the Calico Solar Project ("Project") proposed by Calico Solar, LLC ("Calico Solar") published March 30, 2010. BNSF is one of the two Class 1 railroads operating in California. Its mainline, traversed by as many as 80 trains per day, carries interstate commerce from the Ports of Los Angeles and Long Beach to U.S. Midwestern, Southwestern and Eastern markets.

The Project proposes to place 34,000 SunCatchers, a 5,000-foot transmission line, substation, and maintenance facilities, along both sides of several miles of BNSF's mainline. Given the importance of this corridor, it is essential that safety along BNSF's mainline be maintained. In light of this, BNSF has several concerns regarding the Project with respect to safety and other issues. BNSF has been working with Calico Solar in a cooperative effort to ensure that measures to address BNSF's concerns are incorporated into the Project, and BNSF will continue to do so. Nonetheless, BNSF is providing the following comments to the SA/DEIS to ensure that its concerns are adequately addressed, through Project design, operation plans, permit conditions, or as mitigation measures as appropriate.

**1) Visual Resources – Glint and Glare.** The portion of the BNSF mainline along which the Project is proposed to be built is curved, and an essential signal for rail traffic is located in the vicinity near Hector Road. Both daytime glint and glare from Project mirrors, as well as the spill of light from nighttime maintenance activities, either of which may occur on both sides of the track, may significantly impact BNSF engineers' ability to see the signal. The situation would be exacerbated by the site elevations which Calico Solar has proposed. Glint and glare would not be a mere nuisance issue, but rather could present a significant safety issue. While the SA/DEIS has begun to address glint and glare with respect to motorists on nearby roadways (SA/DEIS pp. C.13-13 – C.13-22), and BNSF understands that a Glint and Glare Study is currently being performed, neither currently addresses potential glare impacts to rail. BNSF requests that these concerns be studied and addressed. As the SA/DEIS has not proposed alternate locations for the Project, it is imperative that these issues be addressed at this time.

**2) Transmission Line Safety and Nuisance – Induction Issues.** The proposed Project would include over 5,000 feet of new transmission line and a new substation immediately adjacent to BNSF's mainline. BNSF has experienced interference with signals and its employees being shocked in similar situations in other locations, and is concerned that the proposed configuration of these Project elements may raise a safety issue. While the SA/DEIS addresses these transmission safety issues generally (SA/DEIS pp. C.12-5 – C.12-7), BNSF requests that they be studied specifically with respect to the proximity of the transmission line and new substation to the mainline, and that appropriate conditions on the locations of these facilities be required.

**3) Hazardous Materials Management – Hydrogen.** Calico Solar proposes an extensive underground pipeline system to provide hydrogen to the 34,000 SunCatchers proposed to be constructed on the 8,230 acre site surrounding the existing mainline. This pipeline system raises at least two safety concerns. First, if a derailment were to occur, given the desert sands, train cars could come in contact with the shallow underground pipeline system. Second, it has been determined that the hydrogen pipeline will have uncontrollable leaks. BNSF understands that Calico Solar has tripled the amount of hydrogen the Project will require due to their greater understanding of the potential for hydrogen pipeline leaks.

In addition to the analysis of hydrogen issues presented at pp. C.5-5 – C.5-13 of the SA/DEIS, BNSF requests that the hazards posed by the location, extent and depth of the proposed underground hydrogen pipeline system, and the anticipated hydrogen leaks, be analyzed with respect to rail operations. BNSF requests that the Risk Analysis being prepared with respect to hydrogen consider a possible derailment scenario. Additionally, BNSF requests that the exact location of hydrogen in relation to the signal cable be determined; that sensors be required to be placed to detect hydrogen leaks; that mitigation measures such as automatic shut-off valves along the hydrogen pipeline be considered; that the Spill Prevention, Control, and Countermeasures Plan require notification of the railroad of hydrogen releases; that an auto-dialer and/or other notification system be established to promptly notify BNSF of hydrogen releases; and that BNSF be granted access to the Project site in the event of an emergency, including derailment.

**4) Geology and Paleontology – Water Supply.** BNSF is concerned the potential drawdown of the groundwater basin by the newly proposed water well may cause subsidence which might adversely affect rail track alignment, creating a safety issue. While the SA/DEIS briefly addresses the issue of possible subsidence due to groundwater pumping at p. C.4-12 (Geology and Paleontology), BNSF suggests that the analysis be expanded. In addition, BNSF requests that a notification procedure be put in place for any noted subsidence, whereby BNSF maintenance teams would be alerted of the issue. BNSF also intends to preserve the option of replacing its abandoned wells in the Hector Road location.

In addition to the above, BNSF is concerned that security for the proposed vehicle access over the bridge over the mainline be considered, and that the BNSF ROW be demarcated to notify Calico Solar employees and others of their proximity to the tracks. BNSF understands that maintenance will be performed at night.

To the extent that any of the above rail-related issues have not been analyzed in the Project SA/DEIS, BNSF asks that the issues be analyzed and incorporated into the SA/DEIS. BNSF further requests that, where applicable, the issues be addressed, through Project design, operation plans, permit conditions, or as mitigation measures as appropriate.

We will continue to work with Calico Solar and look forward to meeting with CEC and BLM Project teams as soon as possible to provide any information or suggestions that will assist the agencies in their analysis and recommendations.



Thank you for the opportunity to comment on the SA/DEIS. If you have any questions, please contact Mr. Edward Phillips at (909) 386-4082.

Very truly yours,

A handwritten signature in black ink, consisting of a stylized 'E' followed by a long horizontal stroke.

Edward Phillips

cc: Cynthia L. Burch, Esq.



**BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT  
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1516 NINTH STREET, SACRAMENTO, CA 95814  
1-800-822-6228 – WWW.ENERGY.CA.GOV**

**APPLICATION FOR CERTIFICATION**

***For the CALICO SOLAR (Formerly SES Solar One)***

**Docket No. 08-AFC-13**

**PROOF OF SERVICE  
(Revised 8/9/10)**

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### DECLARATION OF SERVICE

I, Ani Seferyan, declare that on October 25, 2010, I served and filed copies of the attached "Attachment H - Exhibit 1207" dated October 25, 2010. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [\[www.energy.ca.gov/sitingcases/solarone\]](http://www.energy.ca.gov/sitingcases/solarone).

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

*(Check all that Apply)*

#### FOR SERVICE TO ALL OTHER PARTIES:

- ☒ sent electronically to all email addresses on the Proof of Service list;
- ☐ by personal delivery;
- ☐ by delivering on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses **NOT** marked "email preferred."

**AND**

#### FOR FILING WITH THE ENERGY COMMISSION:

- ☒ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (*preferred method*);

**OR**

- ☐ depositing in the mail an original and 12 paper copies, as follows:

#### **CALIFORNIA ENERGY COMMISSION**

Attn: Docket No. 08-AFC-13  
1516 Ninth Street, MS-4  
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I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

\_\_\_\_\_  
/s/ Ani Seferyan  
Ani Seferyan

# **STATE OF CALIFORNIA**

## **Energy Resources Conservation And Development Commission**

In the Matter of:  
The Application for Certification  
for the Calico Solar Power Project  
Licensing Case

Docket No. 08-AFC-13

### **INTERVENOR BNSF's COMMENTS ON THE PMPD**

## ATTACHMENTS

A	Exhibit 1200
B	Exhibit 1201
C	Exhibit 1202
D	Exhibit 1203
E	Exhibit 1204
F	Exhibit 1205
G	Exhibit 1206
H	Exhibit 1207
I	Exhibit 1208
J	Exhibit 1209
K	Exhibit 1210
L	Exhibit 1211
M	Exhibit 1212
N	Exhibit 1213
O	Exhibit 1214
P	BNSF Post-Hearing Brief
Q	BNSF Comments and Protests to FEIS
R	BNSF Supplemental Comments and Protests to FEIS
S	Sierra Club's PMPD Comments
T	CURE's PMPD Comments



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July 29, 2010

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Mr. Jim Stobaugh  
Project Manager  
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**Re: BNSF Comments Regarding Prehearing Conference  
and for Consideration at Evidentiary Hearing**

**Calico Solar Project (Formerly SES Solar 1)  
Docket No. 08-AFC-13**

Dear Sirs:

BNSF Railway ("BNSF") appreciates the opportunity to present comments for consideration during the Prehearing Conference, during which the Committee will assess the parties' readiness for an evidentiary hearing, identify areas of agreement or dispute, and discuss the remaining schedule and procedures necessary to conclude the certification process, and for consideration during the evidentiary hearing. [Cal. Code Regs., Tit. 20, § 1718.5; Notice of Prehearing Conference and Evidentiary Hearings, p. 3.] BNSF has reviewed the Staff Assessment and Draft Environmental Impact Statement ("SA/DEIS") for the Calico Solar Project ("Project") proposed by the Applicant Calico Solar, LLC ("Applicant" or "Calico Solar") published March 30, 2010, and the Supplemental Staff Assessment ("SSA"), published July 21, 2010. As explained in a previous submission, BNSF is one of the two Class 1 railroads operating in California. BNSF's mainline, which is traversed by as many as 80 trains per day, carries interstate commerce from the Ports of Los Angeles and Long Beach to U.S. Midwestern, Southwestern and Eastern markets. The proposed Project would surround both sides of several miles of BNSF's mainline tracks. Accordingly, BNSF has significant concerns that the construction and operation of the Project do not adversely impact BNSF operations or otherwise impose unacceptable safety risks to BNSF personnel and operations.

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The consummation of the Project would require the granting of several licenses and permits from BNSF, which Calico Solar has requested in a piecemeal fashion over the course of the past year. To date, none of these requested licenses or permits have been granted. Before BNSF can grant such licenses and permits, BNSF must be assured that the concerns detailed below be addressed. The purpose of this submission is to provide the committee with a summary of the areas of concern, and to identify those concerns that BNSF feels have not been resolved.

### ***1. Transmission Line Safety and Nuisance - Induction***

BNSF is concerned the proposed proximity of the transmission line to BNSF's mainline may result in electrical induction on the rail. As has been addressed in previous submissions, the proposed Project would include approximately 1.9 miles of new transmission line immediately adjacent to BNSF's mainline. BNSF has experienced interference with signals, equipment malfunction, and employees being shocked in similar situations in other locations, and is concerned that the proposed configuration of these Project elements may raise a safety issue.

In the absence of any studies addressing induction issues which may be caused by the Project, BNSF has taken a conservative position with respect to the necessary setback of the transmission line to avoid any induction issues, and believes that a 300' setback from the right of way should be maintained. Calico Solar has agreed to set back the proposed transmission line 300' from the BNSF right of way. In addition, per BNSF requirements, in the location where the transmission line is proposed to cross the tracks, it would do so at a 90-degree angle, and would travel 300' from the far side of the right of way before returning to a parallel configuration. Avoiding electrical induction of the rail line is a critical safety requirement. Therefore, BNSF requests that Calico Solar's agreed-upon setback of the transmission line from the right of way be incorporated into the Committee's decision on Calico Solar's application as a Condition of Certification.

### ***2. Hazardous Materials Management - Hydrogen***

Due to critical safety concerns, BNSF opposes the transport of hydrogen above or beneath its tracks. BNSF is concerned that hydrogen pipelines passing under or near the mainline track may adversely impact rail operations and create unacceptable safety risks. Calico Solar has proposed two alternate systems to provide hydrogen to the 34,000 SunCatchers proposed to be constructed on the 6,215 acre site within 100' of both sides of approximately five miles of the transcontinental mainline. Under one scenario, the Applicant would construct a single extensive underground pipeline system, 2 ½ feet below the ground, serving the entire Project. SSA p. C.5-8. This approach would involve boring a hydrogen pipeline under the mainline, which has the potential to compromise the integrity of the track structure. Moreover, BNSF's routine maintenance activities involve digging, trenching, excavating and filling areas of the right of way. A hydrogen pipeline located under or near the right of way could be contacted during these



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activities, posing a safety hazard to employees. Finally, if a derailment were to occur, given the desert sands, train cars could come in contact with the shallow underground pipeline system.

Under the second alternative scenario, hydrogen for the SunCatchers would be generated on-site and would be distributed to the SunCatchers via bottles carried on trucks. SSA p. C.5-8. This would involve individual SunCatchers being supplied from the hydrogen storage tank by trucks. An accident or collision between the hydrogen trucks and another vehicle or train at the at-grade crossing, or an accident on the proposed bridge, could result in significant safety issues.

Calico Solar has represented that it is willing to provide hydrogen to the SunCatchers through two separate hydrogen systems, one on the north side of the right of way and one on the south side, thereby helping to alleviate BNSF's stated concerns. BNSF supports the placement of two separate hydrogen generation facilities, one north and one south of its tracks, and requests that this be incorporated into the Committee's decision on Calico Solar's application as a Condition of Certification. In addition, if Calico Solar opts to use the centralized pipeline system, the appropriate distance of the nearest pipelines to the right of way would need to be determined.

BNSF requests that the Risk Analysis being prepared with respect to hydrogen consider possible derailment scenarios, appropriate mitigation be determined and the system not be activated until all mitigation is fully implemented. BNSF also requests that should the centralized pipeline system be selected, the exact location of hydrogen pipelines in relation to the signal cable and the right of way be evaluated to ensure the protection of rail infrastructure and operations. In addition, BNSF requests that sensors be required to be placed to detect hydrogen leaks; that mitigation measures such as automatic shut-off valves along the hydrogen pipeline be required; that the Spill Prevention, Control, and Countermeasures Plan require notification of the railroad of hydrogen releases which could impact rail safety and operations; and that an auto-dialer and/or other notification system be established to promptly notify BNSF of such hydrogen releases.

### **3. *Biological Resources – Desert Tortoise***

In a derailment scenario, BNSF workers and emergency response personnel must have full access to BNSF's right of way and the adjacent lands in order to respond to the emergency. Such access will likely require temporary removal of portions of the desert tortoise exclusionary fence the Applicant is required to install as part of the Project. BNSF requests that, in the case of derailment or other emergency, Calico Solar be required to provide BNSF access to the Project site for emergency response as a Condition of Certification. This access may include, among other activities, temporary removal of portions of the desert tortoise exclusionary fencing and the placement of a temporary fence. BNSF also requests that the Condition of Certification require Calico Solar contractors and employees to participate in BNSF's environmental sensitivity training program prior to commencing work at the Project site.

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#### **4.      *Soil and Water Resources – Detention Basins***

BNSF is concerned that detention basins are not sufficient to protect the tracks and their supporting structures. The Project incorporates detention basins that have been designed for a 100 year flood. SSA. P. C.7-26. Given the gradient of the Project site, BNSF is concerned that the steps being proposed are not adequate to ensure protection of the tracks and their supporting structures or soil. A characteristic of high desert environs such as the Project site is an increased likelihood of flash floods, which over a sustained period of hours or days may cause the detention basins to overflow and cause a high volume of water in a concentrated flow to wash through the area, eroding the terrain around and supporting the tracks. It needs to be determined whether the applicant should be required to fund the reinforcement of rail infrastructure.

#### **5.      *Hydrology - Subsidence***

As has been addressed in previous submissions, BNSF is concerned the potential drawdown of the groundwater basin by the newly proposed water well may cause subsidence which might adversely affect rail track alignment, increasing the risk of derailment. While the SA/DEIS briefly addresses the issue of possible subsidence due to groundwater pumping at p. C.4-12, and the SSA discusses the issue at C.4-13 (Geology and Paleontology), BNSF is concerned that the analysis may not be sufficient. In addition, while Calico Solar represents that it is currently the only water user in the groundwater basin, BNSF notes that it intends to preserve the option of replacing its abandoned wells in the Hector Road location.

BNSF understands that Calico Solar is required to conduct groundwater monitoring on a quarterly basis. BNSF requests that as a Condition of Certification, Calico Solar be required to provide BNSF with such quarterly reports, and that a notification procedure be put in place for any noted subsidence, whereby BNSF maintenance teams would be alerted of the issue.

#### **6.      *Transportation – Glint and Glare***

As has been addressed in previous submissions, the portion of the BNSF mainline along which the Project is proposed to be built is curved. An essential signal for rail traffic is located in the vicinity near Hector Road. Signals are critical safety features. The Applicant proposes to locate the nearest SunCatchers as close as 100' from the right of way, on both sides of the transcontinental mainline track for approximately five miles. Daytime glint and glare from the 34,000 SunCatcher mirrors and associated structures, in particular when the mirrors are in offset tracking position, may significantly impact BNSF engineers' ability to see the signal. The situation would be exacerbated by the site elevations which Calico Solar has proposed.

BNSF is required by federal regulations to maintain visual contact with signals. If a train's contact with a signal is lost and cannot be regained, the engineer is required to stop the train.

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This often requires an emergency application of the brakes, risking derailment of the train. When a train has been stopped through emergency application of the brakes, BNSF General Code of Operating Rule 6.23 requires the engineer to inspect all cars, units, equipment and track pursuant to BNSF special instructions and rules. This can cause significant delays to rail operations with ramifications reaching from the Ports of Los Angeles and Long Beach to Chicago and beyond.

The illuminated background created by the SunCatcher field could result in an engineer perceiving the signal to be dark or to be displaying a white light, both of which, under BNSF General Code of Operating Rule 9.4, require the engineer immediately to stop the train.

Thus, glint and glare are critical safety and operational issues. While the SA/DEIS has begun to address glint and glare with respect to motorists on nearby roadways (SA/DEIS pp. C.13-13 – C.13-22), and BNSF understands that a Glint and Glare Study is currently being performed, neither currently addresses potential glare impacts to rail, nor are these studies specific to the Project site. In addition, the SSA Transportation section has not yet been released, and BNSF is therefore unable to make meaningful comments on the potential Glint and Glare analysis at this time.

BNSF requests that the following Condition of Certification be incorporated into the Project:

Prior to the first SunCatcher disc being mounted on a pedestal, a site-specific Glare/Glint study shall be performed to address the Glare /Glint issues raised by BNSF with respect to the potential impact of the proposed Calico Solar Suncatchers on BNSF rail operations and the recommended mitigation measures, once approved by BNSF, shall be implemented by Calico Solar at its expense. The site specific study shall commence immediately upon BNSF's selection of the experts to perform the study. In the event the CEC's on-going Glare/Glint study resolves BNSF's Glare/Glint issues to BNSF's satisfaction, BNSF will advise the CEC and Calico Solar and the CEC site-specific Glare/Glint study and the implementation of its mitigation measures shall be deemed compliance with the above Condition of Approval.

As information and studies and the section of the SSA responsive to this critical concern, among other vital transportation related concerns, remain to be published in the coming weeks, BNSF intends to submit a petition to intervene in this proceeding. Accordingly, Calico Solar has agreed to support BNSF's petition. BNSF will include the above comments in declarations as soon as possible, some of which will accompany the petition to intervene.

To the extent that any of the above rail-related issues have not been analyzed in the Project SA/DEIS or SSA, BNSF asks that the issues be analyzed and incorporated into any Committee decision regarding the Project. BNSF requests that, where applicable, the issues be addressed, through Project design, operation plans, permit conditions, or as mitigation measures as

Mr. Christopher Meyer

Mr. Jim Stobaugh

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appropriate. We will continue to work with Calico Solar and look forward to meeting with CEC and BLM Project teams as soon as possible to provide any information or suggestions that will assist the agencies in their analysis and recommendations. Thank you for the opportunity to comment on the SA/DEIS and SSA. If you have any questions, please contact Mr. Joseph Schnell at (817) 352-1918.

Very truly yours,

A handwritten signature in black ink, appearing to read "J. Schnell", written in a cursive style.

Joseph Schnell



**BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT  
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**APPLICATION FOR CERTIFICATION**

***For the CALICO SOLAR (Formerly SES Solar One)***

**Docket No. 08-AFC-13**

**PROOF OF SERVICE  
(Revised 8/9/10)**

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### DECLARATION OF SERVICE

I, Ani Seferyan, declare that on October 25, 2010, I served and filed copies of the attached "Attachment I - Exhibit 1208" dated October 25, 2010. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [\[www.energy.ca.gov/sitingcases/solarone\]](http://www.energy.ca.gov/sitingcases/solarone).

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

*(Check all that Apply)*

#### FOR SERVICE TO ALL OTHER PARTIES:

- ☒ sent electronically to all email addresses on the Proof of Service list;
- ☐ by personal delivery;
- ☐ by delivering on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses **NOT** marked "email preferred."

**AND**

#### FOR FILING WITH THE ENERGY COMMISSION:

- ☒ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (*preferred method*);

**OR**

- ☐ depositing in the mail an original and 12 paper copies, as follows:

#### **CALIFORNIA ENERGY COMMISSION**

Attn: Docket No. 08-AFC-13  
1516 Ninth Street, MS-4  
Sacramento, CA 95814-5512  
[docket@energy.state.ca.us](mailto:docket@energy.state.ca.us)

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

\_\_\_\_\_  
/s/ Ani Seferyan  
Ani Seferyan

# **STATE OF CALIFORNIA**

## **Energy Resources Conservation And Development Commission**

In the Matter of:  
The Application for Certification  
for the Calico Solar Power Project  
Licensing Case

Docket No. 08-AFC-13

### **INTERVENOR BNSF's COMMENTS ON THE PMPD**



## ATTACHMENTS

A	Exhibit 1200
B	Exhibit 1201
C	Exhibit 1202
D	Exhibit 1203
E	Exhibit 1204
F	Exhibit 1205
G	Exhibit 1206
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S	Sierra Club's PMPD Comments
T	CURE's PMPD Comments

Transmission Line Safety and Nuisance (Transmission Lines)

**TLSN-5**

**Calico Solar's transmission lines must be emplaced so that there is a 300 foot setback from the furthest edge of the BNSF RoW to the transmission line and Calico Solar's transmission lines must cross the BNSF mainline at a 90-degree angle, and travel 300' from the far side of the RoW before returning to a parallel configuration.**

**Verification:** At least 30 days before the lines are energized, the project owner shall transmit to the CPM a letter confirming compliance with this condition.

Hazardous Materials (Hydrogen)

**HAZ-7 (addition)**

**No hydrogen will be transported over or under the BNSF mainline or through the BNSF right-of-way.**

**HAZ-8 (addition in redline)**

**The project owner shall:**

**a. Conduct a process hazard analysis and prepare a Process Safety Management Plan (PSM Plan) that contains a hazard analysis, including for rail operations, using a Hazard and Operability Study (HAZOP).**

**b. Retain . . .**

**c. Consistent with the final report, will ensure that sensors are placed to detect hydrogen leaks; that mitigation measures such as automatic shut-off valves along the hydrogen pipeline are established; that the Hazardous Business Materials Plan requires notification of the railroad of hydrogen releases which could impact rail safety and operations; and that an auto-dialer and/or other notification system will be established to promptly notify BNSF of such hydrogen releases.**

## Biological Resources

### **BIO-15 (addition)**

**In the case of derailment or other emergency, Calico Solar is required to provide BNSF access to the Project site for emergency response as a Condition of Certification. This access may include, among other activities, temporary removal of portions of the desert tortoise exclusionary fencing and the placement of a temporary fence.**

### **BIO-6 (addition)**

**All Calico Solar contractors and employees will participate in BNSF's environmental sensitivity training program prior to commencing work at the Project site.**

## Hydrology/Soil & Water (Detention Basins)

### **SOIL&WATER-8 (addition)**

**Prior to installing any SunCatchers or construction of the detention basins, BNSF will commission a hydrology study at Calico Solar's expense to determine the impact, if any, on rail safety and BNSF operations of its planned emplacement of SunCatchers and detention basins and determine appropriate mitigation measures, if necessary, to be paid for by Calico Solar.**

### **SOIL&WATER-7 (addition)**

**Calico Solar will provide BNSF with copies of quarterly groundwater monitoring reports that it supplies to the regional water quality control board. Calico Solar will establish a notification procedure for any noted subsidence, whereby BNSF maintenance teams will be alerted of the issue.**



**BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT  
COMMISSION OF THE STATE OF CALIFORNIA  
1516 NINTH STREET, SACRAMENTO, CA 95814  
1-800-822-6228 – WWW.ENERGY.CA.GOV**

**APPLICATION FOR CERTIFICATION**

***For the CALICO SOLAR (Formerly SES Solar One)***

**Docket No. 08-AFC-13**

**PROOF OF SERVICE  
(Revised 8/9/10)**

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### DECLARATION OF SERVICE

I, Ani Seferyan, declare that on October 25, 2010, I served and filed copies of the attached "Attachment J - Exhibit 1209" dated October 25, 2010. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [\[www.energy.ca.gov/sitingcases/solarone\]](http://www.energy.ca.gov/sitingcases/solarone).

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**AND**

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1516 Ninth Street, MS-4  
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[docket@energy.state.ca.us](mailto:docket@energy.state.ca.us)

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

\_\_\_\_\_  
/s/ Ani Seferyan  
Ani Seferyan

# **STATE OF CALIFORNIA**

## **Energy Resources Conservation And Development Commission**

In the Matter of:  
The Application for Certification  
for the Calico Solar Power Project  
Licensing Case

Docket No. 08-AFC-13

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# **GCOR**

## **General Code of Operating Rules**

**Sixth Edition**

**Effective April 7, 2010**

**These rules herein govern the operations of the railroads listed and must be complied with by all employees regardless of gender whose duties are in any way affected thereby. They supersede all previous rules and instructions inconsistent therewith.**

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**Revised Edition**

This version is updated to include BNSF's amendments through August 1, 2010. The following pages are revised or added:

**April 7, 2010:** i-5, i-6, i-9, i-10, 1-5, 1-6, 1-13, 1-14, 1-15, 1-16, 2-3, 2-4, 5-3, 5-4, 5-5, 5-6, 5-7, 5-8, 5-13, 5-14, 5-19, 5-20, 6-1, 6-2, 6-3, 6-4, 6-5, 6-6, 6-11, 6-12, 6-13, 6-14, 6-15, 6-16, 6-17, 6-18, 7-1, 7-2, 7-3, 7-4, 8-7, 8-8, 9-3, 9-4, 9-9, 9-10, 10-1, 10-2, 10-3, 10-4, 13-1, 13-2, 13-3, 13-4, 14-3, 14-4, 14-5, 14-6, 14-7 (added), 14-8 (added), 15-1, 15-2, 15-3, 15-4, 15-5, 15-6, 20-1 (added), 20-2 (added), GL-1, GL-2, GL-3, GL-4.

**August 1, 2010:** Cover page, i-2, i-7, i-8, 5-9, 5-10, 5-11, 5-12.

**Adopted by:**

Acadiana Railway Company	Boise Valley Railroad
Adrian & Blissfield Rail Road Company	Buckingham Branch Railroad
Alabama & Gulf Coast Railway	Buffalo & Pittsburg Railroad
Alabama Southern Railroad	California Northern Railroad
Alabama & Tennessee River Railway, LLC	California Western Railroad
Alabama Warrior Railroad	Camas Prairie RailNet, Inc.
Alaska Railroad Corporation	Canadian Pacific
Albany & Eastern Railroad Company	Caney Fork & Western Railroad
Aliquippa & Ohio River Railroad	Canon City and Royal Gorge Railroad
Alliance Terminal Railway, LLC	Carolina Piedmont Railroad
Altamont Commuter Express Rail Authority	Carrizo Gorge Railway
Alton & Southern Railway	Cascade and Columbia River Railroad
Amtrak—Chicago Terminal	Cedar Rapids & Iowa City Railway Company
Amtrak—Michigan Line	Central California Traction Company
Amtrak—NOUPT	Central Illinois Railroad
AN Railway	Central Kansas Railway
Apache Railway Company	Central Midland Railway
A&R Terminal Railroad Company	Central Montana Rail
Arizona & California Railroad	Central Oregon & Pacific Railroad, Inc.
Arizona and California Railway Company	Central Railroad of Indiana
Arizona Central Railroad	Central Railroad of Indianapolis
Arizona Eastern Railway Company	Charlotte Southern Railroad Company
Arkansas Louisiana & Mississippi Railroad	Chattahoochee Bay Railroad
Arkansas Midland Railroad Company Inc.	Chattahoochee Industrial Railroad
Arkansas & Missouri Railroad Company	Chattooga & Chickamauga Railway
Arkansas Southern Railroad	Chesapeake & Albemarle Railroad Company, Inc.
Ashtabula, Carson & Jefferson Railroad	Chicago, Ft. Wayne & Eastern Railroad
AT&L Railroad Company	Chicago Rail Link
Atlantic & Western Railway	Chicago SouthShore & South Bend Railroad
Austin Western Railroad	City of Prineville Railway
Baton Rouge Southern Railroad	C&NC Railroad Corporation
Bauxite & Northern Railway	Columbia Basin Railroad Co.
Bay Line Railroad	Columbia and Cowlitz Railway
Belt Railway Company of Chicago	Columbia Terminal
BHP Nevada Railway Company	Columbus & Greenville Railway
Blackwell Northern Gateway Railroad	Columbus & Ohio River Railroad
BNSF Railway	Commonwealth Railway
	Connecticut Southern Railroad

Corpus Christi Terminal Railroad	Great Western Railway
Council Bluffs Railway	Gulf Colorado & San Saba Railroad
D&I Railroad	Huron and Eastern Railway Company, Inc.
Dakota, Minnesota & Eastern Railroad	Hutchinson and Northern Railway Company
Dakota, Missouri Valley & Western Railroad, Inc.	Idaho Northern & Pacific Railroad Company
Dakota Southern Railway	Illinois & Midland Railroad, Inc.
Dallas, Garland & Northeastern Railroad, Inc.	Illinois Railway, Inc.
Dardanelle & Russellville Railroad	Indiana & Ohio Railway
Decatur Junction Railway Company	Indiana Rail Road Company
Denver Rock Island Railroad	Indiana Southern Railroad, Inc.
DeQueen & Eastern Railroad Company	International Bridge & Terminal Company
Detroit Connecting Railroad Company	Iowa Chicago & Eastern Railroad
East Tennessee Railway	Iowa Interstate Railroad Ltd.
Eastern Alabama Railway	Iowa Northern Railway Company
Eastern Idaho Railroad	Jaxport Terminal Railway
Ellis & Eastern Company	Kansas City Southern Railway
Escanaba & Lake Superior Railroad	Kansas City Terminal Railway Company
Farmrail Corporation	Kansas & Oklahoma Railroad
First Coast Railroad	Kaw River Railroad
Florida East Coast Railway	Kentucky West Tennessee Railway
Fordyce & Princeton Railroad	Keokuk Junction Railway Company
Fort Worth & Western Railroad	Kettle Falls International Railway, LLC
Fox Valley & Western	Kiamichi Railroad
Fulton County Railway, LLC	Kyle Railroad Company
Galveston Railroad	Lahaina Kaanapali & Pacific Railroad
Gateway Western Railway	Lake Superior and Ishpeming Railroad
Georgetown Railroad Company	Lapeer Industrial Railroad Company
Georgia Central Railway	Lewis and Clark Railway Company
Georgia & Florida Railway	Little Rock and Western Railway, LP
Georgia Southwestern Railroad, Inc.	Longview Switching Company
Georgia Woodlands Railroad	Los Angeles Junction Railway
Golden Isles Terminal Railroad	Louisiana and Delta Railroad Company
Golden Triangle Railroad	Louisiana Southern Railroad
Grain Belt Corp	Luxapalila Valley Railroad
Grand Canyon Railway	Mahoning Valley Railroad
Grand Elk Railroad	Manufacturers Junction Railway
Grand Rapids Eastern Railroad	Maryland Midland Railway
Great Northwest Railroad	Maumee & Western Railroad

McCloud Railway Company	North Carolina & Virginia Railroad Company, Inc.
Meridian and Bigbee Railroad	Northeast Illinois Regional Commuter Railroad Corp.
Meridian Southern Railway, LLC	Northern Indiana Commuter Transportation District
Messena Terminal Railroad Company	Northern Lines Railway
Michigan Air-Line Railway Company	Northern Ohio & Western Railway
Michigan Central Railway	Northern Plains Railroad
Michigan Shore Railroad	Ohio & Pennsylvania Railroad
Mid-Michigan Railroad, Inc.	Ohio Central Railroad
Minnesota Commercial Railway Company	Ohio Southern Railroad
Minnesota, Dakota & Western Railway Company	Omaha, Lincoln & Beatrice Railway Company
Minnesota Northern Railroad, Inc.	Osceola and St. Croix Valley Railroad Company
Minnesota Prairie Line Incorporated	Otter Tail Valley Railroad Company, Inc.
Minnesota Southern Railway	Pacific Harbor Line
Minnesota Valley Transportation Company	Pacific Sun Railroad
Mission Mountain Railroad	Palouse River and Coulee City Railroad
Mississippi Southern Railroad	Panhandle Northern Railroad
Mississippi & Tennessee RailNet, Inc.	Pecos Valley Southern Railway Company
Mississippi Tennessee Railroad	Pend Oreille Valley Railroad
Missouri & Northern Arkansas RR Company, Inc.	Peninsula Corridor Joint Powers Board (Caltrain)
Missouri & Valley Park Railroad	Pennsylvania Southwestern Railroad
Modesto & Empire Traction Company	Pittsburgh Industrial Railroad
Montana Rail Link	Pittsburgh & Ohio Central Railroad
Mount Vernon Terminal Railway, Inc.	Point Comfort & Northern Railway Company
Napa Valley Railroad Company	Port Bienville Railroad
Nashville and Eastern Railroad	Port of Tillamook Bay Railroad
Nashville and Western Railroad	Portland & Western Railroad
National Coal Rail Line	Portland Terminal Railroad Company
Nebkota Railway, Inc.	Progressive Rail Inc.
Nebraska Central Railroad Company	Puget Sound & Pacific Railroad
Nebraska Kansas Colorado Railway, Inc.	Rarus Railway, Inc.
Nebraska Northeastern Railway Company	Red River Valley & Western Railroad Co.
New England Central Railroad, Inc.	Riceboro Southern Railway
New Mexico Rail Runner Express	Richmond Pacific Railroad
New Orleans & Gulf Coast Railway Company	Richmond Terminal Railroad Company
New Orleans Lower Coast Railroad	Rio Valley Switching Company
New Orleans Public Belt Railroad	Rochester & Southern Railroad
Newburgh & South Shore Railroad Company	Rockdale, Sandow & Southern Railroad Company
New York & Atlantic Railway	Saginaw Valley Railroad Company

San Diego & Imperial Valley Railroad Company, Inc.	Timber Rock Railroad
San Diego Northern Railway	Toledo, Peoria & Western Railway
San Francisco Bay Railroad	Tomahawk Railroad
San Joaquin Valley Railroad Co., Inc.	Transportación Ferroviaria Mexicana
San Luis Central Railroad Company	Trinity Railway Express
San Pedro and Southwestern Railway Company	Trona Railway Company
Sand Springs Railway Company	Tulare Valley Railroad
Santa Cruz, Big Trees & Pacific Railway Company	Tulsa-Sapulpa Union Railway Company
Santa Fe Southern Railway, Inc.	Twin Cities & Western Railroad Company
Sault Ste. Marie Bridge Company	Union Pacific Railroad
Savage Bingham & Garfield Railroad Company	United States Army Military Railroad System
Savannah Port Terminal Railroad	Utah Central Railway
SEMO Port Railroad	Utah Railway Company
Sierra Railroad Company	Utah Transit Authority
South Buffalo Railway	V&S Railroad Inc.
South Carolina Central Railroad Company, Inc.	Valdosta Railway
South Central Tennessee Railroad	Ventura County Railway Company
South East Kansas Railroad	Verde Canyon Railroad
South Kansas and Oklahoma Railroad	Vicksburg Southern Railroad
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Southern California Regional Rail Authority	Wabash Central Railroad
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Texas - New Mexico Division	Yellowstone Valley Railroad
Texas North Western Railway Company	York Railway
Texas Northeastern Railroad	Youngstown & Austintown Railroad
Texas, Gonzales & Northern Railway Company	Youngstown Belt railroad
Texas Rock Crusher Railway Co.	Yreka Western Railroad



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## **1.0 General Responsibilities**

### **1.1 Safety**

Safety is the most important element in performing duties. Obeying the rules is essential to job safety and continued employment.

#### **1.1.1 Maintaining a Safe Course**

In case of doubt or uncertainty, take the safe course.

#### **1.1.2 Alert and Attentive**

Employees must be careful to prevent injuring themselves or others. They must be alert and attentive when performing their duties and plan their work to avoid injury.

#### **1.1.3 Accidents, Injuries, and Defects**

Report by the first means of communication any accidents; personal injuries; defects in tracks, bridges, or signals; or any unusual condition that may affect the safe and efficient operation of the railroad. Where required, furnish a written report promptly after reporting the incident.

#### **1.1.4 Condition of Equipment and Tools**

Employees must check the condition of equipment and tools they use to perform their duties. Employees must not use defective equipment or tools until they are safe to use. Employees must report any defects to the proper authority.

## **1.2 Personal Injuries and Accidents**

### **1.2.1 Care for Injured**

When passengers or employees are injured, do everything reasonable to care for them.

### **1.2.2 Witnesses**

If equipment is involved in personal injury, loss of life, or damage to property, the employee in charge must immediately secure the names, addresses, and occupations of all persons involved, including all persons at the scene when the accident occurred and those that arrived soon after. The employee in charge must secure the names regardless of whether these persons admit knowing anything about the accident.

The employee in charge must also obtain the license numbers of nearby automobiles. When necessary, other employees can assist in obtaining this information, which must be included in reports covering the incident.

Where signaling devices are provided or a flagman is on duty, the employee in charge and assisting employees must try to determine who, among the witnesses, can testify whether the signaling devices were functioning properly or if the flagman was performing his duties properly.

When possible, obtain the names of witnesses who can testify about the bell and whistle signals.

### **1.2.3 Equipment Inspection**

If an accident results in personal injury or death, all tools, machinery, and other equipment involved, including the accident site, must be inspected promptly by the foreman, another person in charge of the work, or other competent inspectors. The inspector must promptly forward to his manager a report of the inspection. The report must include the condition of the equipment and the names of those making the inspection.

The equipment inspected must be marked for identification and placed in custody of the responsible manager or employee until the claims department is contacted and determines disposition.

### **1.2.4 Mechanical Inspection**

When engines, cars, or other equipment are involved in an accident that results in personal injury or death, the equipment must be inspected before it leaves the accident site.

A mechanical department employee must further inspect the equipment at the first terminal. This employee must promptly report inspection results to the proper manager.

### **1.2.5 Reporting**

All cases of personal injury, while on duty or on company property, must be immediately reported to the proper manager and the prescribed form completed.

A personal injury that occurs while off duty that will in any way affect employee performance of duties must be reported to the proper manager as soon as possible. The injured employee must also complete the prescribed written form before returning to service.

If an employee receives a medical diagnosis of occupational illness, the employee must report it immediately to the proper manager.

### **1.2.6 Statements**

Except when authorized by the proper manager:

- Information concerning accidents or personal injuries that occur to persons other than employees may be given only to an authorized representative of the railroad or an officer of the law.
- Information about the facts concerning the injury or death of an employee may be given only to a person in interest such as the injured employee, an immediate relative of the injured or deceased employee, an authorized representative of the railroad, or an officer of the law.
- Information in the files or in other privileged or confidential reports of the railroad concerning accidents or personal injuries may be given only to an authorized representative of the railroad.

### **1.2.7 Furnishing Information**

Employees must not withhold information, or fail to give all the facts to those authorized to receive information regarding unusual events, accidents, personal injuries, or rule violations.

## 1.3 Rules

### 1.3.1 Rules, Regulations, and Instructions

**Safety Rules.** Employees must have a copy of, be familiar with, and comply with all safety rules issued in a separate book or in another form.

**General Code of Operating Rules.** Employees governed by these rules must have a current copy they can refer to while on duty.

**Hazardous Materials.** Employees who in any way handle hazardous materials must have a copy of the instructions or regulations for handling these materials. Employees must be familiar with and comply with these instructions or regulations.

**Air Brakes.** Employees whose duties are affected by air brake operation must have a copy of the rules and instructions for operating air brakes and train handling. Employees must know and obey these rules and instructions.

**Timetable and Special Instructions.** Employees whose duties are affected by the timetable and special instructions must have a current copy they can refer to while on duty.

**Train Dispatchers and Control Operators.** The train dispatchers and control operators must have a copy of the rules and instructions for train dispatchers and control operators. They must be familiar with and obey those rules and instructions.

**Classes.** Employees must be familiar with and obey all rules, regulations, and instructions and must attend required classes. They must pass the required examinations.

**Explanation.** Employees must ask their supervisor for an explanation of any rule, regulation, or instruction they are unsure of.

**Issued, Canceled, or Modified.** Rules may be issued, canceled, or modified by track bulletin, general order, or special instructions.

### 1.3.2 General Orders

General orders:

- Are numbered consecutively.
- Are issued and canceled by the designated manager.
- Contain only information and instructions related to rules or operating practices.
- Replace any rule, special instruction, or regulation that conflicts with the general order.

Before beginning each day's work or trip, crew members and any others whose duties require, must review general orders that apply to the territory they will work on.

### 1.3.3 Circulars, Instructions, and Notices

Circulars, instructions, notices, and other information are issued and canceled by the designated manager. Before beginning each day's work or trip, crew members and any others whose duties require, must review those that apply to the territory they will work on.

## 1.4 Carrying Out Rules and Reporting Violations

Employees must cooperate and assist in carrying out the rules and instructions. They must promptly report any violations to the proper supervisor. They must also report any condition or practice that may threaten the safety of trains, passengers, or employees, and any misconduct or negligence that may affect the interest of the railroad.

### 1.4.1 Good Faith Challenge

#### A. Right to Challenge

Federal Regulations have provisions that allow an employee the right to challenge a directive which, based upon the employee's good faith determination, would violate a railroad operating rule relating to:

- Shoving movements.
- Leaving equipment foul of an adjacent track.
- or
- Handling of hand-operated switches or fixed derails.

#### B. Good Faith Challenge Procedure

1. An employee may inform a supervisor issuing a directive that a good faith determination has been made that the directive would violate a railroad operating rule relating to:
  - Shoving movements.
  - Leaving equipment foul of an adjacent track.
  - or
  - Handling of hand-operated switches or fixed derails.
2. The supervisor will not require the employee to comply with the directive until the challenge is resolved. The supervisor may:
  - Require the challenging employee to perform other tasks not related to the challenge until the challenge is resolved.
  - or
  - Direct an employee, other than the challenging employee, to perform the challenged task before the challenge is resolved. Employee so directed will be informed of the challenge, and determine that the challenged task does not violate the rules.

#### C. Resolving Good Faith Challenge

1. A challenge may be resolved by one of the following:
  - The supervisor's acceptance of the employee's request.
  - An employee's acceptance of the directive.
  - An employee's agreement to a compromise solution acceptable to the person issuing the directive.
2. If the challenge cannot be resolved because the supervisor issuing the directive has determined that the employee's challenge has not been made in good faith or there is no alternative to the direct order, the railroad will:
  - Provide immediate review by at least one manager, which must not be conducted by the supervisor issuing the challenged directive or that supervisor's subordinate.
  - Resolve the challenge using the same options available for resolving the challenge as the initial supervisor.

3. If the manager making the final decision concludes that the challenged directive would not cause the employee to violate any requirement of the involved rules, the reviewing manager's decision shall be final and not subject to further immediate review.
  - The manager will inform the employee that Federal law may protect the employee from retaliation, if the employee's refusal to do the work is a lawful, good faith act.
  - The employee making the challenge will be afforded an opportunity to document, in writing or electronically, any protest to the manager making the final decision before the employee's tour of duty is complete. The employee will be afforded the opportunity to retain a copy of the protest.

#### **D. Request for Review and Verification of Decision**

Upon written request, at the time of the challenge, the employee has the right for further review by the "Designated Review Manager". Within 30 days after the expiration of the month during which the challenge occurred, the "Designated Review Manager" will verify the proper application of the rule in question. The verification decision shall be made in writing to the employee.

#### **E. Employee Rights and Remedies**

The Good Faith Challenge is not intended to abridge any rights or remedies available to the employee under a collective bargaining agreement or any Federal law.

## **1.5 Drugs and Alcohol**

The use or possession of alcoholic beverages while on duty or on company property is prohibited. Employees must not have any measurable alcohol in their breath or in their bodily fluids when reporting for duty, while on duty, or while on company property.

The use or possession of intoxicants, over-the-counter or prescription drugs, narcotics, controlled substances, or medication that may adversely affect safe performance is prohibited while on duty or on company property, except medication that is permitted by a medical practitioner and used as prescribed. Employees must not have any prohibited substances in their bodily fluids when reporting for duty, while on duty, or while on company property.

## **1.6 Conduct**

Employees must not be:

1. Careless of the safety of themselves or others.
2. Negligent.
3. Insubordinate.
4. Dishonest.
5. Immoral.
6. Quarrelsome.
- or
7. Discourteous.

Any act of hostility, misconduct, or willful disregard or negligence affecting the interest of the company or its employees is cause for dismissal and must be reported. Indifference to duty or to the performance of duty will not be tolerated.

### **1.6.1 Motor Vehicle Driving Records**

Employees certified as engineers, whatever class of service, must report convictions for:

- Operating a motor vehicle while under the influence of, or impaired by, alcohol or a controlled substance.
- Refusal to undergo such testing when a law enforcement official seeks to find out whether a person is operating under the influence of alcohol or a controlled substance.

State-sponsored diversion programs, guilty pleas, and completed state actions to cancel, revoke, suspend, or deny a driver's license are considered convictions as applied to this rule.

An employee must report any conviction to an employee assistance representative within 48 hours after the employee receives notice of the conviction.

### **1.6.2 Notification of Felony Convictions**

The conduct of any employee leading to conviction of any felony is prohibited. Any employee convicted of a felony must notify the proper authority of that fact within 48 hours after the employee receives notice of the conviction.

### **1.6.3 Notification of Deteriorating Vision or Hearing**

Any engineer who has knowledge that their hearing or vision has deteriorated and cannot be corrected to the minimum acceptable requirement as outlined in federal regulations (20/40 distant visual acuity, 70 degree field of vision, ability to recognize/distinguish between railroad color signals, hearing loss no greater than 40 decibels) must report that fact immediately to the proper authority or the medical department.

## **1.7 Altercations**

Employees must not enter into altercations with each other, play practical jokes, or wrestle while on duty or on railroad property.

## **1.8 Appearance**

Employees reporting for duty must be clean and neat. They must wear the prescribed uniform when required.

## **1.9 Respect of Railroad Company**

Employees must behave in such a way that the railroad will not be criticized for their actions.

## **1.10 Games, Reading, or Electronic Devices**

### **BNSF Amendment—Entire rule is changed to read:**

Employees on duty must not:

- Play games.
- Read magazines, newspapers, or other literature not related to their duties.
- Have magazines, newspapers, and other literature not related to duties available for viewing in the cab of engines. This does not prohibit employees from having such material enclosed in their personal luggage.



**Cellular Phones**

During normal operations, cellular phones must be turned off and ear pieces removed:

- When employees are on a moving train (includes supervisors).
- When members of your crew are on the ground performing duties related to train movement, switching, performing air tests, riding equipment, providing inspection of passing trains, assisting in preparation of their train or fouling the track (within four feet of nearest rail of a track).
- When other employees are performing safety related duties associated with your train.

**Exceptions: Cellular phones may be used:**

- For voice communications only, while train is stopped and any member of their crew is not engaged in safety-related duties including switching, performing air tests, riding equipment, inspecting passing trains, assisting in preparation of a train or fouling the track (within four feet of nearest rail of track), and all crew members have been briefed that operations have been suspended.
- To access electronically stored rule-related files (only) when train is stopped. However, text messaging, e-mailing or use of other device features is prohibited.
- While on passenger trains or business cars for business purposes provided they are not used in the controlling unit or the cab room of the controlling cab car. Use must not interfere with any safety related duties including calling or acknowledging signals.
- When use relates to mechanical or technical evaluations (e.g. testing of signal system, Electronic Train Management System, distributed power, etc.). Before using the cell phone, a safety briefing is required with all assigned crew members and all must agree how communications can safely take place.
- During emergencies, while deadheading or transporting by means other than on a freight train, or as outlined in GCOR 2.5 (Communication Redundancy) due to radio failure.

**Electronic Devices**

Electronic devices such as Hammerhead, Renegade or other similar devices may be used for company business while train is stopped and no crew members are engaged in safety-related duties including switching, performing air tests, riding equipment, inspecting passing trains, assisting in preparation of a train or fouling the track (within four feet of nearest rail of a track) and all crew members have briefed that operations have been suspended.

Laptop computers may be used (only to access electronically stored rule-related files) when the train is stopped or while deadheading or being transported by means other than by freight train (without restriction).

Electronic devices such as DVD/CD players, MP3 players, iPods, internet browsers, text messaging and e-mailing devices:

- May not be used by crews on a train while on duty. Devices must be turned off and ear pieces removed (includes supervisors).
- May be used while deadheading or being transported by means other than by freight train.

Railroad supplied devices related to train movement and locomotive/train control systems (e.g. Remote Control Transmitter, railroad electronic displays, Electronic Train Management System, distributed power, head-end device, etc.) are not restricted or prohibited.

Digital clocks/timepieces are not considered electronic devices.

## 1.11 Sleeping

Employees must not sleep while on duty, except as outlined under Rule 1.11.1 (Napping). Employees reclined with their eyes closed will be in violation of this rule.

### 1.11.1 Napping

Napping is permitted by train crews, except crews in passenger, commuter or yard service, under the following conditions:

- The crew is waiting for departure of their train.
- or
- The train is stopped enroute waiting to be met or passed by a train, waiting for track work, waiting for helper locomotive, or similar conditions.

Restrictions are as follows:

- A job briefing must be conducted, with agreement reached as to who will nap and who must remain awake. Each crew member has the right and responsibility to refuse to allow another crew member to take a nap if doing so could jeopardize the personal safety of employees, the train, or the public.
- One crew member must remain awake at all times.
- The nap period must not exceed 45 minutes, which includes the time needed to fall asleep. The napping employee is relieved of all duties.
- Train must not be delayed for an employee to take a nap. When conditions allow the train to move, the employee who is to remain awake must immediately waken the napping employee.
- Before napping, while waiting for the arrival of their train, employees must ensure all duties have been completed. These duties include reviewing general orders and notices; securing and reviewing track warrants, track bulletins, and other paperwork, if available.
- Before napping is allowed enroute, the employee in charge of the locomotive controls must:
  1. Make at least a 10-lb. brake pipe reduction.
  2. Place generator field switch in the "OFF" position.
  3. Center the reverser and remove, if removable.
- The employee who is to remain awake must remain on the locomotive while others on the locomotive are napping, except when inspecting passing trains.
- If waiting for the arrival of or make-up of train, one crew member must remain awake while waiting for their train's arrival or make-up at their initial terminal unless arrangements have been made with a third party to wake up all crew members.

All crew members that are deadheading or otherwise relieved of duties may nap.

## 1.12 Weapons

While on duty or on railroad property, employees must not have firearms or other deadly weapons, including knives with a blade longer than 3 inches. However, railroad police are authorized to possess firearms in the course of their work.

### **1.13 Reporting and Complying with Instructions**

Employees will report to and comply with instructions from supervisors who have the proper jurisdiction. Employees will comply with instructions issued by managers of various departments when the instructions apply to their duties.

### **1.14 Employee Jurisdiction**

Employees are under the jurisdiction of the supervisors of the railroad they are operating on.

When operating on another railroad, unless otherwise instructed, employees will be governed by:

- Safety rules, air brake and train handling rules, and hazardous materials instructions of the railroad they are employed by.
- The operating rules, timetable and special instructions of the railroad they are operating on.

### **1.15 Duty - Reporting or Absence**

Employees must report for duty at the designated time and place with the necessary equipment to perform their duties. They must spend their time on duty working only for the railroad. Employees must not leave their assignment, exchange duties, or allow others to fill their assignment without proper authority. Continued failure by employees to protect their employment will be cause for dismissal.

### **1.16 Subject to Call**

Employees subject to call must indicate where they can be reached and must not be absent from their calling place without notifying those required to call them.

### **1.17 Hours of Service Law**

Employees must be familiar and comply with the requirements of the federal hours of service law. Employees are expected to use off-duty time so they are prepared for work.

If an employee is called to report for duty before legal off-duty time has expired, before accepting the call to work, the employee must notify the individual making the call that off-duty time has not expired.

#### **A. Notification**

When communication is available, employees must notify the train dispatcher or another authority of the time the law requires them to be off duty. Employees must provide notification early enough that they may be relieved, or transportation provided, before they exceed the hours of service.

#### **B. Exceeding the Law**

Employees must not exceed the hours of service law without proper authority. However, they must not leave trains, engines, or cars on the main track without proper protection. Employees must secure trains properly and, if possible, before they exceed the hours of service. Except as provided by this paragraph, employees are then relieved of all duties.

### **1.18 Unauthorized Employment**

Employees must not engage in another business or occupation that would create a conflict of interest with their employment on the railroad or would interfere with their availability for service or the proper performance of their duties.

## **1.19 Care of Property**

Employees are responsible for properly using and caring for railroad property. Employees must return the property when the proper authority requests them to do so. Employees must not use railroad property for their personal use.

## **1.20 Alert to Train Movement**

Employees must expect the movement of trains, engines, cars, or other movable equipment at any time, on any track, and in either direction.

Employees must not stand on the track in front of an approaching engine, car, or other moving equipment.

Employees must be aware of location of structures or obstructions where clearances are close.

## **1.21 Occupying Roof**

Employees whose duties require them to occupy the roof of a car or engine must do so only with proper authority and when the equipment is standing.

## **1.22 Not Permitted on Equipment**

Unauthorized persons must not be permitted on equipment.

## **1.23 Altering Equipment**

Without proper authority, employees must not alter, nullify, change the design of, or in any manner restrict or interfere with the normal function of any device or equipment on engines, cars, or other railroad property, except in the case of an emergency. Employees must report to the proper supervisor changes made in an emergency.

## **1.24 Clean Property**

Railroad property must be kept in a clean, orderly, and safe condition. Railroad buildings, facilities, or equipment must not be damaged or defaced. Only information authorized by the proper manager or required by law may be posted on railroad property.

## **1.25 Credit or Property**

Unless specifically authorized, employees must not use the railroad's credit and must not receive or pay out money on the railroad account. Employees must not sell or in any way get rid of railroad property without proper authority. Employees must care for all articles of value found on railroad property and promptly report the articles to the proper authority.

## **1.26 Gratuities**

Employees must not discriminate among railroad customers. Employees must not accept gifts or rewards from customers, suppliers, or contractors of the railroad unless authorized by the proper manager.

## **1.27 Divulging Information**

Employees who make up, handle, or care for any of the following must not allow an unauthorized person to access them or disclose any information contained in them:

- Correspondence.
- Reports.
- Books.
- Bills of Lading.
- Waybills.
- Tickets.
- Statistics.

## **1.28 Fire**

Employees must take every precaution to prevent loss and damage by fire.

Employees must report promptly to the train dispatcher any fires seen on or near the right of way, unless the fires are being controlled. If there is danger of the fire spreading to a bridge or other structure, crew members must stop their train and help extinguish the fire.

Cause of fire, if known, must be promptly reported.

## **1.29 Avoiding Delays**

Crew members must operate trains and engines safely and efficiently. All employees must avoid unnecessary delays.

When possible, train or engine crews wanting to stop the train to eat must ask the train dispatcher at least one hour and thirty minutes before the desired stop.

## **1.30 Riding Engine**

When possible, crew members on the head end of freight trains must ride in the control compartment of the engine.

When riding on the head end, the conductor will ride in the control compartment.

## **1.31 Repairs to Foreign Cars**

Crew members who repair foreign cars must report the repairs on the prescribed form.

## **1.32 Overheated Wheels**

When overheated wheels are found on a train, the train must be stopped and held a minimum of 10 minutes to allow the heat to equalize through the wheel.

### **1.33 Inspection of Freight Cars**

When personnel are not on duty primarily to inspect freight cars, each car placed in the train may be moved after it receives a safety inspection as follows:

- Cars must be checked for:
  - Leaning.
  - Sagging.
  - Improper position on the truck.
  - Objects hanging or dragging from the car or extending from the side.
  - Insecurely attached doors.
  - Broken or missing safety appliances.
  - Contents leaking from placarded hazardous material car.
  - Insecure coupling device.
  - Overheated wheel or journal.
  - Broken or cracked wheel.
  - Brake that fails to release.
  - Staff type brake not in fully raised position.
  - Any apparent hazard that could cause an accident.
- Open top loads, including trailers and containers on flat cars, must be loaded safely.
- If width or height approaches clearance restrictions, movement must be cleared with the proper authority.

A freight car with any defect that makes movement unsafe must be corrected or set out of the train. When a defect is discovered enroute, note the type of defect on proper tag and attach a tag on each side of the car.

A freight car with three bad order tags indicating that the car is safe to move may be moved to the nearest car repair point. The conductor will remove one bad order tag from the side with two tags. The conductor will use this written information from the tag to inform other crew members of the restrictions.

### **1.34 Flat Spots**

If a wheel on a piece of equipment has a flat spot more than 2 1/2 inches long, or if the wheel has adjoining flat spots that are each at least 2 inches long, the equipment must not be moved faster than 10 MPH. Such equipment must be set out at the first available point.

### **1.35 Dump Doors**

Be sure dump doors on cars are closed after a load is dumped. If car must be moved short distances with the dump doors open, make sure the doors and chains will clear tracks and crossings.

### 1.36 Excessive Dimension Loads

Place excessive dimension loads on or near the head end of trains.

Instructions will be issued to trains handling excessive dimension loads. If no instructions have been issued regarding handling the car, the conductor will immediately notify the train dispatcher.

Crew members handling excessive dimension equipment must ensure that the equipment will clear nearby objects, including equipment on adjacent tracks. If the train cannot reach a point with enough clearance, crew members must make sure protection is provided against movements on adjacent tracks.

### 1.37 Open Top Loads

**BNSF Amendment—Entire rule is changed to read:**

Flat cars, open top cars, and open TOFC/COFC's with loads which protrude beyond the car ends or if shifted, would protrude beyond the car ends must not be placed in trains next to the following if train length and makeup permit:

- Occupied outfit car
- Passenger car
- Engine
- Caboose
- Shipment of automotive vehicles or machinery that is not fully enclosed

This restriction does not apply to cars equipped with chains or cables securing the load to the car.

### 1.38 Shipments Susceptible to Damage

Shipments with painted or finished surfaces susceptible to damage, such as automobiles, trucks, tractors, combines, and other similar equipment or machinery, must not be placed closer than the fifth car behind open top cars loaded with commodities such as coal, sand, gravel, lime, soda ash, etc. subject to wind, vapor, or fume action on adjacent cars. Exceptions include shipments susceptible to damage that are:

- Loaded in cars that fully enclose the shipments.
- or
- Fully protected by a covering.

An open top car loaded with sand, gravel, lime, soda ash, etc. subject to wind, vapor, or fume action in other than a solid unit train must not be placed immediately ahead of an occupied caboose.

### 1.39 Accuracy of Speed Indicator

The engineer must verify speed indicator accuracy as soon as possible after taking charge of the engine. If the speed indicator is not accurate to within 3 MPH plus or minus at speeds of 10 to 30 MPH and to within 5 MPH plus or minus at speeds above 30 MPH, the engineer must immediately report the variance to the train dispatcher.

### 1.40 Reporting Engine Defects

The engineer will report any engine defect on the proper form and notify the relieving engineer, when needed.

## **1.41 Engines Coupled to Occupied Passenger Cars**

Engines coupled to equipment that includes occupied passenger cars must not be left without an authorized employee in charge.

## **1.42 Trains Detoured**

When trains are detoured over another railroad, the engineer of the detoured train will operate the engine, unless otherwise approved by a manager of the railroad the train is being detoured over.

The pilot will inform the engineer of speed restrictions, signals, sidings, etc. to make sure the train detours over the railroad safely.

## **1.43 Stopped in Tunnels**

### **A. Engine or Train Stopped in Tunnel**

When an engine is stopped in a tunnel and cannot move promptly, crew members must:

1. Shut down diesel engine at once.
2. Shut down Waukesha or similar type engines.
3. Make a full service air brake application.
4. Apply hand brakes to prevent movement in case the air brakes leak off.

### **B. Passenger Train Stopped in Tunnel or Deep Snow**

Crew members of a passenger train stopped in a tunnel or deep snow must:

1. Shut off any air circulating systems including:
  - a. Air conditioning.
  - b. Ice machines.
  - c. Generators.
2. Shut air intake shutters.
3. Turn off blower fans.

### **C. Notification if Stopped in Tunnel or Deep Snow**

The train dispatcher should be notified immediately so that proper arrangements can be made to protect persons and equipment.

### **D. When These Requirements Will Not Apply**

These requirements will not apply if air currents carry the exhaust gases away from the train. Safety of passengers and crew members must be the first consideration.

## **1.44 Duties of Train Dispatchers**

Train dispatchers supervise train movement and any employees connected with that movement.

## **1.45 Duties of Control Operators and Operators**

Control operators and operators are under the direction of the train dispatcher when their duties concern handling track warrants, track bulletins, lineups, the movement of trains, and any other instructions issued by the train dispatcher.



## 1.46 Duties of Yardmasters

The yardmaster is responsible for and shall directly supervise yard crews, clerks, and all other employees working in the yard. The yardmaster must see that they work in a safe, efficient, and economical manner, according to the rules, regulations, and instructions of the railroad. Yardmasters must ensure the prompt and regular movement of cars, especially the proper makeup of trains and their movement into and out of the yard.

At locations where yardmasters are on duty, employees in train, engine, and yard service must comply with the yardmaster's instructions. At locations where no yardmaster is on duty, these employees will work according to the instructions of designated employees.

**BNSF Amendment—The following is added:**

At the end of each shift, the yardmaster must make a transfer, filling in all the required information, including:

- All grade crossings out of service
- Any undelivered Track Bulletin Restrictions
- Any tracks, switches, or other infrastructure out of service
- Any other conditions or issues which may affect the safe and efficient management of the yard.

If the office has more than one shift, the yardmaster being relieved will remain until the relieving yardmaster understands, accepts, and acknowledges the transfer.

The transfer must be documented in Yardmaster Transfer in YDS. If TSS is not available, the transfer must be documented in writing and maintained for 30 days.

## 1.47 Duties of Crew Members

The conductor and the engineer are responsible for the safety and protection of their train and observance of the rules. They must ensure that their subordinates are familiar with their duties, determine the extent of their experience and knowledge of the rules. They must instruct them, when necessary, how to perform their work properly and safely. If any conditions are not covered by the rules, they must take precautions to provide protection.

### A. Conductor Responsibilities

1. The conductor supervises the operation and administration of the train (if trains are combined with more than one conductor on board, the conductor with the most seniority takes charge). All persons employed on the train must obey the conductor's instructions, unless the instructions endanger the train's safety or violate the rules. If any doubts arise concerning the authority for proceeding or safety, the conductor must consult with the engineer who will be equally responsible for the safety and proper handling of the train.
2. The conductor must advise the engineer and train dispatcher of any restriction placed on equipment being handled.
3. The conductor must remind the engineer that the train is approaching an area restricted by:
  - Limits of authority.
  - Track warrant.
  - Track bulletin.

or

  - Radio speed restriction.

The conductor must inform the engineer after the train passes the last station, but at least 2 miles from the restriction.

4. When the conductor is not present, other crew members must obey the instructions of the engineer concerning rules, safety, and protection of the train.
5. Freight conductors are responsible for the freight carried by their train. They are also responsible for ensuring that the freight is delivered with any accompanying documents to its destination or terminals. Freight conductors must maintain any required records.

#### **B. Engineer Responsibilities**

1. The engineer is responsible for safely and efficiently operating the engine. Crew members must obey the engineer's instructions that concern operating the engine. A student engineer or other qualified employee may operate the engine under close supervision of the engineer. Any employee that operates an engine must have a current certificate in their possession.
2. The engineer must check with the conductor to determine if any cars or units in the train require special handling.

#### **C. All Crew Members' Responsibilities**

1. To ensure the train is operated safely and rules are observed, all crew members must act responsibly to prevent accidents or rule violations. Crew members in the engine control compartment must communicate to each other any restrictions or other known conditions that affect the safe operation of their train sufficiently in advance of such condition to allow the engineer to take proper action. If proper action is not being taken, crew members must remind engineer of such condition and required action.
2. Crew members in the engine control compartment must be alert for signals. As soon as signals become visible or audible, crew members must communicate clearly to each other the name of signals affecting their train. They must continue to observe signals and announce any change of aspect until the train passes the signal. If the signal is not complied with promptly, crew members must remind the engineer and/or conductor of the rule requirement. If crew members do not agree on the signal indication, regard the signal as the most restrictive indication observed.

**BNSF Amendment—The following is added:**

Crew members must not use binoculars or similar devices to determine the position, aspect, or indication displayed by a fixed signal.

3. When the engineer and/or conductor fail to comply with a signal indication or take proper action to comply with a restriction or rule, crew members must immediately take action to ensure safety, using the emergency brake valve to stop the train, if necessary.

## **1.48 Time**

While on duty, crew members must have a watch. Other employees must have access to a watch or clock.

The watch or clock must:

- Be in good working condition and reliable.
- Display hours, minutes, and seconds.
- Not vary from the correct time by more than 30 seconds.
- Be compared with the time source designated in special instructions.

## 2.0 Railroad Radio Rules

### 2.1 Transmitting

Any employee operating a radio must do the following:

- Before transmitting, listen long enough to make sure the channel is not being used.
- Give the required identification.
- Not proceed with further transmission until acknowledgment is received.

### 2.2 Required Identification

Employees transmitting or acknowledging a radio communication must begin with the required identification.

The identification must include the following in this order:

- For base or wayside stations:
  - Name or initials of the railroad.
  - Name and location or other unique designation.
- For mobile units:
  - Name or initials of the railroad.
  - Train name (number), engine number, or words that identify the precise mobile unit.

If communication continues without interruption, repeat the identification every 15 minutes.

#### Short Identification

After making a positive identification for switching, classification, and similar operations within a yard, fixed and mobile units may use a short identification after the initial transmission and acknowledgment.

### 2.3 Repetition

An employee who receives a transmission must repeat it to the person transmitting the message, except when the communication:

- Concerns yard switching operations.
  - Is a recorded message from an automatic alarm device.
- or
- Is general and does not contain any information, instruction, or advice that could affect the safety of a railroad operation.

### 2.4 Ending Transmissions

Employees using a radio for transmissions must state to the employee receiving the transmission the following as it applies to indicate the communication has ended or is completed:

“OVER” — when a response is expected.

or

“OUT” preceded by required identification — when no response is expected.

However, these requirements do not apply to yard switching operations.

## **2.5 Communication Redundancy**

The controlling unit on any train that requires an air brake test must be equipped with an operative radio, unless relieved by Rule 2.18 (Malfunctioning Radio). In addition, trains must have a second means of communication, which may include:

- An operative radio on any unit in the consist.
- A portable radio.  
or
- Other wireless communication device.

## **2.6 Communication Not Understood or Incomplete**

An employee who does not understand a radio communication or who receives a communication that is incomplete must not act upon the communication and must treat it as if it was not sent.

**EXCEPTION: An employee who receives information that may affect the safety of employees or the public or cause damage to property must take the safe course. When necessary, stop movement until the communication is understood.**

## **2.7 Monitoring Radio Transmissions**

Radios in attended base stations or mobile units must be turned on to the appropriate channel with the volume loud enough to receive communications. Employees attending base stations or mobile units must acknowledge all transmissions directed to the station or unit.

## **2.8 Acknowledgment**

An employee receiving a radio call must acknowledge the call immediately, unless doing so would interfere with safety.

## **2.9 Misuse of Radio Communications**

**Employees must not use radio communication to avoid complying with any rule.**

## **2.10 Emergency Calls**

Emergency calls will begin with the words “Emergency, Emergency, Emergency”. These calls will be used to cover initial reports of hazardous conditions which could result in death or injury, damage to property or serious disruption of railroad operations such as:

- Derailments.
- Collisions.
- Storms.
- Washouts.
- Fires.
- Track obstructions.  
or
- Emergency brake applications.

In addition, emergency calls must be made for the following:

- Overrunning limits of authority.
- or
- Overrunning Stop indications.

Emergency calls must contain as much complete information on the incident as possible.

All employees must give absolute priority to an emergency communication. Unless they are answering or aiding the emergency call, employees must not transmit until they are certain no interference will result.

## **2.11 Prohibited Transmissions**

Employees must not transmit a false emergency, or an unnecessary or unidentified communication. Employees must not use indecent language over the radio. Employees must not reveal the existence, contents, or meaning of any communication (except emergency communications) to persons other than those it is intended for or those whose duties may require knowing about it.

## **2.12 Fixed Signal Information**

Employees must not use the radio to give information to a train or engine crew about the name, position, aspect, or indication displayed by a fixed signal, unless the information is given between members of the same crew or the information is needed to warn of an emergency.

## **2.13 Not Used**

## **2.14 Transmission of Mandatory Directives**

When transmitted by radio, mandatory directives must conform to applicable operating rules and the following:

- The train dispatcher must state which mandatory directive will be transmitted.
- The employee must inform the train dispatcher when ready to copy stating the employee's occupation (ex. conductor, engineer, foreman, maintainer), name and location on the main track or where the main track will be entered. An employee operating the controls of a moving engine may not copy mandatory directives. In addition, mandatory directives must not be transmitted to the crew of a moving train if the conductor, engineer or train dispatcher feels that the transmission could adversely affect the safe operation of the train.
- The employee receiving a mandatory directive must copy it in writing using the format outlined in the operating rules.
- Before a mandatory directive is acted upon, the conductor and engineer must each have a written copy and each crew member must read and understand it.

### **2.14.1 Verbally Transmitting and Repeating Mandatory Directives**

When transmitting and repeating mandatory directives:

- State and spell single digit numbers by number and digit.
- State multiple digit numbers by number and digit.
- Identify decimal points as "point", "dot", or "decimal".
- State and spell directions.

**BNSF Amendment—The following rule is added:**

### **2.14.2 Before Reporting Clear of Authority Limits**

Before a field employee reports clear or releases a portion of authority limits, and the Train Dispatcher/Control Operator accepts the information, the following must occur:

- The employee will provide their name or other identification and the authority number to the Train Dispatcher/Control Operator.
- The Train Dispatcher/Control Operator will have the required form or computer screen displayed for data entry and confirmation.
- The Train Dispatcher/Control Operator and employee will carefully match the verbally transmitted information against the authority form to ensure the information matches and is correct.

## **2.15 Phonetic Alphabet**

If necessary, a phonetic alphabet (Alpha, Bravo, Charlie, etc.) will be used to pronounce clearly any letter used as an initial, except initial letters of railroads.

## **2.16 Assigned Frequencies**

The railroad must authorize any radio transmitters used in railroad service. Radio transmitters must operate on frequencies the Federal Communications Commission assigns the railroad. Employees are prohibited from using other transmitters or railroad frequencies not assigned to that particular territory.

## **2.17 Radio Testing**

Test radios to be used as soon as possible before beginning of work assignment.

The radio test must include an exchange of voice transmissions with another radio. The test must confirm the quality of the radio's transmission.

## **2.18 Malfunctioning Radio**

Malfunctioning radios must not be used. As soon as possible, notify each crew member and the train dispatcher or other affected employees that the radio is not working.

If a radio fails on the controlling locomotive enroute, the train may continue until the earlier of:

- The next calendar day inspection.
- or
- The nearest forward point where the radio can be repaired or replaced.

## **2.19 Blasting Operations**

Employees must not operate radio transmitters located less than 250 feet from blasting operations.

## **2.20 Internal Adjustments**

Employees are prohibited from making internal adjustments to a railroad radio unless they are specifically authorized by the FCC or hold a current Certified Technicians Certificate. Employees authorized to make adjustments must carry their FCC operator license, Certified Technicians Certificate, or verification card while on duty.

## **3.0 Section Reserved**

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## **4.0 Timetables**

### **4.1 New Timetable**

The moment a new timetable goes into effect, it will replace the previous one.

#### **4.1.1 Notice of New Timetable**

At least 24 hours before a new timetable goes into effect, notification will be made by general order. A track bulletin will also be issued at least 24 hours before the new timetable goes into effect and continue for 6 days after the effective date.

### **4.2 Special Instructions**

Special instructions will replace any rule or regulation with which they conflict.

### **4.3 Timetable Characters**

Timetable characters are letters and symbols located in the timetable station column. These letters and symbols indicate the special conditions at specific locations (such as yard limits and manual interlockings). A timetable station column may also include information on the method of operation (such as TWC, ABS, CTC, or DTC). Explanation of characters will be shown in the timetable.

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## **5.0 Signals and Their Use**

### **5.1 Signal Equipment**

Employees who give or display signals must have the proper appliances. Appliances must be in good condition and ready to use.

### **5.2 Receiving and Giving Signals**

#### **5.2.1 Looking for Signals**

To recognize and follow signals correctly, employees must:

- Always be on the lookout for signals.
- Comply with the intent of the signal.
- Not act on any signal that they do not understand or that may be intended for other trains or engines.

#### **5.2.2 Signals Used by Employees**

To give clear signals during the day and at night, employees must:

##### **A. During the Day**

1. Use the correct color of flags or lights.
2. Use day signals from sunrise to sunset.
3. Flagmen providing protection as outlined in Rule 6.19 (Flag Protection) must have a red flag and six red fusees.

##### **B. At Night**




1. Use the correct color of reflectorized flags or lights.
2. Use night signals from sunset to sunrise or when day signals cannot be seen clearly.
3. Flagmen providing protection as outlined in Rule 6.19 (Flag Protection) must have a white light and six red fusees.

Flags may be made from cloth, metal, or other suitable material.

## 5.3 Hand and Radio Signals

### 5.3.1 Hand Signals

The following diagram illustrates the hand signals for a train or engine to stop, proceed, or back up.

Description of Signal	Indication	Movement
1. Swung at a right angle to the track	STOP	
2. Raised and lowered vertically	PROCEED	
3. Swung slowly in a circle at a right angle to the track	BACK UP	

[Diagram A.]

Employees may use other hand signals only if all crew members understand the signals. When employees are not giving hand signals, they must not make any gestures or movements that may resemble a hand signal.

### 5.3.2 Giving Signals

Employees who give signals must:

- Make sure signals can be plainly seen.
- Give signals clearly so they can be understood.
- Give signals on the engineer's side of the track when practical.

### 5.3.3 Signal Disappearance

If a person disappears who is giving the signal to back or shove a train, engine, or car, or the light being used disappears, employees must:

- Stop movement, unless employee on leading car controls the air brakes.

### 5.3.4 Signal to Stop

**Any object waved violently by any person on or near the track is a signal to stop.**

### 5.3.5 Acknowledge Stop Signal

Except when switching, acknowledge hand signal to stop a train. When flagged, the engineer must obtain a thorough explanation from the flagman before proceeding.

### 5.3.6 Radio and Voice Communication

Employees may use radio and other means of voice communication to give information when using hand signals is not practical. Employees must make sure crew members:

- Know which moves will be made by radio communication.
- Understand that while using the radio, the engineer will not accept any hand signals, unless they are Stop signals.

### 5.3.7 Radio Response

When radio communication is used to make movements, crew members must respond to specific instructions given for each movement. Radio communications for shoving movements must specify the direction and distance and must be acknowledged when distance specified is more than four cars.

**Movement must stop within half the distance specified unless additional instructions are received.**

## 5.4 Flags for Temporary Track Conditions

### 5.4.1 Temporary Restrictions

Track bulletins, track warrants, or general orders may restrict or stop train movements because of track conditions, structures or men or equipment. Yellow flags are used to indicate temporary speed restrictions. Yellow-red flags are used to indicate when a train may be required to stop. When flags are not displayed, that information will be included in the track bulletin, track warrant, or general order.

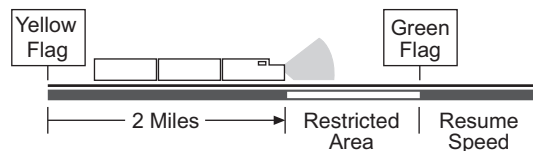
**BNSF Amendment—The last sentence is deleted from the second paragraph:**

When a restriction spans adjoining subdivisions, separate temporary restrictions may be issued on each subdivision. ~~Only one set of flags may be displayed in advance of the entire restriction in each direction.~~

### 5.4.2 Display of Yellow Flag

#### A. Restriction Specified in Writing

**Two Miles Ahead of Restricted Area.** Yellow flags warn trains to restrict movement because of track conditions or structures. To make sure train movement is restricted at the right location, employees must display a yellow flag 2 miles before the restricted area.

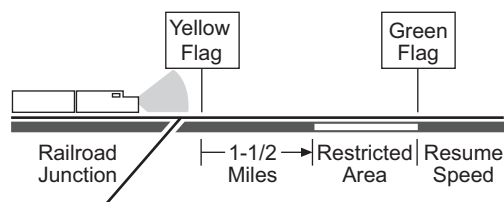


[Diagram A.]

~~**Less than Two Miles Ahead of Restricted Area.** When the restricted area is close to a terminal, junction, or another area, employees will display the yellow flag less than 2 miles before the restricted area. This information will also be included in the track bulletin, track warrant, or general order.~~

**BNSF Amendment—The paragraph “Less than Two Miles Ahead of Restricted Area”, is changed to read:**

**Less than Two Miles Ahead of Restricted Area.** When the restricted area is close to a terminal, junction, or another area or if restriction is on a siding, employees will display the yellow flag less than 2 miles before the restricted area. This information will also be included in the track bulletin, track warrant, or general order.



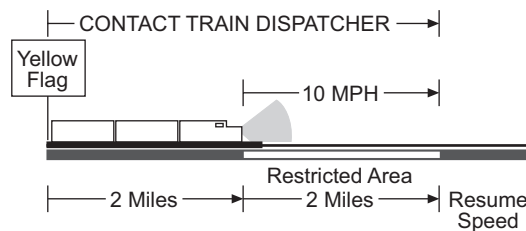
[Diagram B.]

**Once the Train Reaches the Restricted Area.** The speed specified by track warrant, track bulletin, general order, or radio speed restriction must not be exceeded until the rear of the train clears the restricted area.

#### B. Restriction Is Not Specified in Writing

When a yellow flag is displayed and the restriction is not specified by a track bulletin, track warrant, or general order, once the train is 2 miles beyond the yellow flag, crew members must:

1. Continue moving the train but at a speed not exceeding 10 MPH.
2. Resume speed only after the rear of the train has:
  - a. Passed a green flag.
  - or
  - b. Traveled 4 miles beyond the yellow flag and the train dispatcher has verified that no track bulletin or track warrant is in effect specifying a temporary speed restriction at that location.



[Diagram C.]

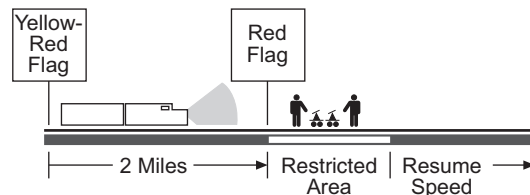
### 5.4.3 Display of Yellow-Red Flag

Maintenance of Way employees may display yellow-red flags from one hour before the track bulletin Form B takes effect until one hour after it expires. During that time, trains may accept instructions from the employee in charge as outlined in Rule 15.2 (Protection by Track Bulletin Form B).

The display of yellow-red flags as described does not extend the authorized working time beyond the times listed on the track bulletin Form B.

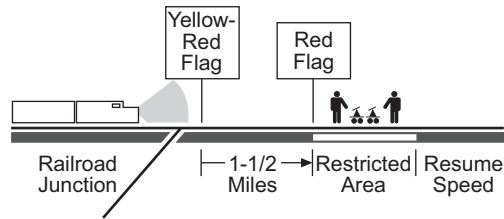
#### A. Restriction Specified in Writing

**Two Miles Ahead of Restricted Area.** Yellow-red flags warn a train to be prepared to stop because of men or equipment. To make sure the train is prepared to stop at the right location, employees must display a yellow-red flag 2 miles before the restricted area.



[Diagram A.]

**Less Than Two Miles Ahead of Restricted Area.** When the restricted area is close to a terminal, junction, or another area, employees will display the yellow-red flag less than 2 miles before the restricted area. This information will also be included in the track bulletin, track warrant, or general order.



[Diagram B.]

#### B. Restriction Is Not Specified in Writing

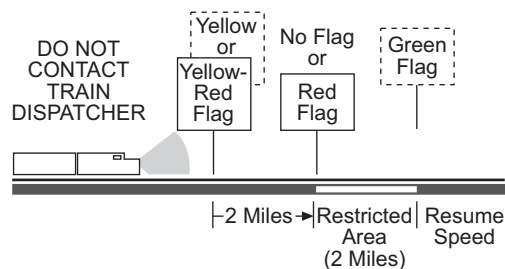
When a yellow-red flag is displayed and the restriction is not specified by a track bulletin, track warrant, or general order, crew members must be prepared to stop short of a red flag 2 miles beyond the yellow-red flag. If a red flag is displayed, proceed as outlined in Rule 5.4.7 (Display of Red Flag or Red Light). If no red flag is displayed:

1. Move at restricted speed.
2. Increase speed only after:
  - a. A crew member has received instructions from the employee in charge.
  - or
  - b. The leading wheels of movement are 4 miles beyond the yellow-red flag, and the train dispatcher has verified that no track bulletin or track warrant protecting men or equipment is in effect at that location.

### 5.4.4 Authorized Protection by Yellow or Yellow-Red Flag

On subdivisions where maximum speed does not exceed 40 MPH, and it is authorized by special instructions, yellow or yellow-red flags may be displayed without the use of track bulletins, track warrants, or flagmen. Yellow or yellow-red flags must be displayed 2 miles before the restricted area. Protection will begin at a point 2 miles beyond the yellow or yellow-red flag and continue for 2 more miles, as outlined in Rule 5.4.2 (Display of Yellow Flag) and Rule 5.4.3 (Display of Yellow-Red Flag).

**Note:** Crew members do not need to receive verification from the train dispatcher when this rule is in effect.

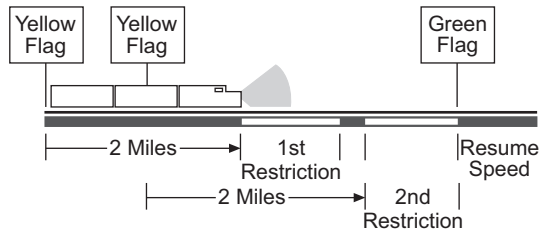


[Diagram A.]

### 5.4.5 Display of Green Flag

A green flag indicates the end of a temporary speed restriction. If a series of locations requires reduced speeds, the green flags could overlap yellow flags. When this is the case, employees must:

- Place a yellow flag before each speed restriction.
- Place a green flag at the end of the last speed restriction.



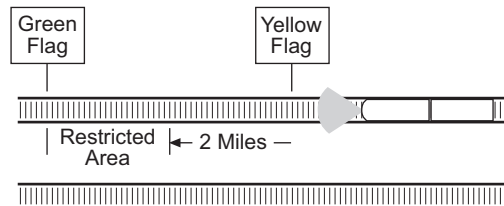
[Diagram A.]

**BNSF Amendment—The following rule is canceled.**

### ~~5.4.6 Display of Flags Within Current of Traffic~~

#### ~~A. Yellow and Green Flags~~

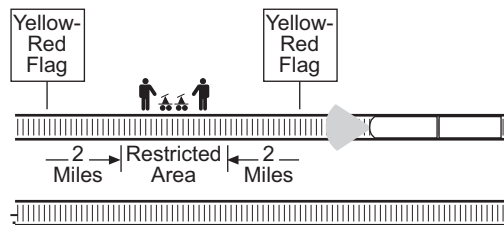
~~Flags for temporary speed restrictions will only be placed for trains moving with the current of traffic.~~



~~[Diagram A.]~~

#### ~~B. Yellow-Red Flags~~

~~Flags protecting men or equipment must be placed in both directions on each track affected.~~



~~[Diagram B.]~~



### 5.4.7 Display of Red Flag or Red Light

A red flag or red light is displayed where trains must stop. When approaching a red flag or red light, the train must stop short of the red flag or red light and not proceed unless the employee in charge gives instructions, including the milepost location of the red flag or red light. A crew member must attempt to contact the employee in charge to avoid delay, giving the location of the red flag or red light and the track being used. If instructions to proceed are received before the train stops, the train may pass the red flag or red light without stopping.

If track bulletin Form B is not in effect, instructions must include speed and distance. This speed must not be exceeded until the rear of the train has passed the specified distance from the red flag or red light, unless otherwise instructed by the employee in charge.

**Displayed Between Rails.** When a red flag or red light is displayed between the rails of a track, the train must stop and not proceed until the flag or light has been removed by an employee of the class that placed it.

### 5.4.8 Flag Location

~~Flags will be displayed only on the track affected. However, when yellow, yellow-red, or red flags or red lights are used for protection without a track bulletin, track warrant, or general order, these flags must be placed to protect all possible access to the restricted area.~~

**BNSF Amendment—The first paragraph is changed to read:**

Flags will be displayed on all main tracks and sidings leading to the track affected.

Flags or red lights must be displayed to the right of the track as viewed from an approaching train. In multiple main track territory or where sidings are adjacent to main track(s), they will be placed on the field side of outside tracks. Red flags or red lights may be displayed between the rails as outlined in Rule 5.4.7 (Display of Red Flag or Red Light). Flags or red lights will be placed in this manner unless otherwise specified by track bulletin, track warrant, special instructions, or general order.

When flags are displayed beyond the first rail of an adjacent track, the flags will not apply to the track on which the train is moving.

## 5.5 Permanent Speed Signs

Permanent speed restriction signs will be placed in advance of permanent speed restrictions. Numbers on the face of these signs indicate the highest speed permitted over the limits of the restriction.

### Two Sets of Numbers

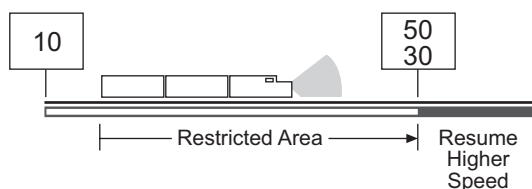
When two sets of numbers are shown, the greater number governs trains consisting entirely of passenger equipment. The lesser number governs all other trains.

### Resume Speed Signs

A permanent resume speed sign or a speed sign showing a higher speed will be placed at the end of each restriction.

Crew members must not exceed the speed shown on each permanent speed restriction sign until the rear of the train:

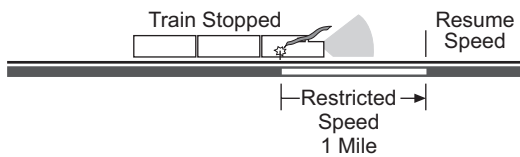
- Has passed a permanent resume speed sign or a sign showing a higher speed.
- or
- Has cleared the limits of the restriction.



[Diagram A.]

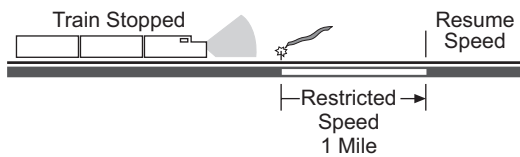
## 5.6 Unattended Fusee

If a train approaches an unattended fusee burning on or near its track, the train must stop consistent with good train handling.



[Diagram A.]

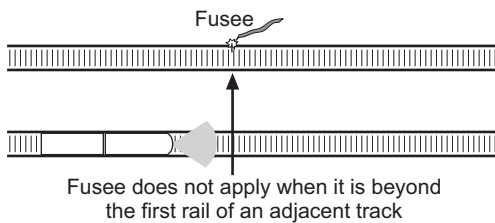
A train moving at restricted speed must stop before passing the fusee.



[Diagram B.]

After stopping, the train must proceed at restricted speed for 1 mile beyond the fusee.

If the unattended burning fusee is beyond the first rail of an adjacent track, the fusee does not apply to the track on which the train is moving.



[Diagram C.]

Do not place fusees where they may cause fires.

## 5.7 Not Used

## 5.8 Bell and Whistle Signals

### 5.8.1 Ringing Engine Bell

Ring the engine bell under any of the following conditions:

- Before moving, except when making momentary stop and start switching movements.
- As a warning signal anytime it is necessary.
- When approaching men or equipment on or near the track.

**BNSF Amendment—Add the following fourth bullet:**

- When whistle signal (7) is required.
- Approaching public crossings at grade with the engine in front start signal at the crossing sign. If no sign, or if movement begins between sign and crossing, start signal soon enough before crossing to provide warning. Continue ringing bell until the crossing is occupied.

### 5.8.2 Sounding Whistle

The whistle may be used at anytime as a warning regardless of any whistle prohibitions.

When other employees are working in the immediate area, sound the required whistle signal before moving.

Other forms of communications may be used in place of whistle signals, except signals (1), (7), and (8). See following chart.

The required whistle signals are illustrated by “o” for short sounds and “—” for longer sounds:

<u>Sound</u>		<u>Indication</u>
(1)	Succession of short sounds	Use when persons or livestock are on the track at other than road crossings at grade. In addition, use to warn railroad employees when an emergency exists, such as a derailment. When crews on other trains hear this signal, they must stop until it is safe to proceed.
(2)	—	When stopped: air brakes are applied, pressure equalized.
(3)	— —	Release brakes. Proceed.
(4)	o o	Acknowledgment of any signal not otherwise provided for.
(5)	o o o	When stopped: back up. Acknowledgment of hand signal to back up.
(6)	o o o o	Request for signal to be given or repeated if not understood.
(7)	— — o —	<p>When approaching public crossings at grade with the engine in front, sound signal as follows:</p> <ul style="list-style-type: none"> <li>A. At speeds in excess of 45 MPH, start signal at or about the crossing sign but not more than 1/4 mile before the crossing.</li> <li>B. At speeds of 45 MPH or less, start signal at least 15 seconds, but not more than 20 seconds, before entering the crossing.</li> <li>C. If no crossing sign start signal at least 15 seconds, but not more than 20 seconds before entering crossing but not more than 1/4 mile before the crossing.</li> <li>D. If movement starts less than 1/4 mile from a crossing, signal may be sounded less than 15 seconds before the crossing when it is clearly seen traffic is not approaching the crossing, traffic is not stopped at the crossing or when crossing gates are fully lowered.</li> </ul> <p>Prolong or repeat signal until the engine completely occupies the crossing(s).</p>
(8)	— o	<p><b>BNSF Amendment—Indication for sound (8) is changed to read:</b></p> <p>Regardless of any whistle prohibitions:</p> <p>Approaching men or equipment or other individuals on or near the track.</p> <p>After sounding initial warning for men or equipment or other individuals, sound whistle signal (4) intermittently until the head end of train has passed the men or equipment or other individuals.</p> <p>Whistle warning is not required:</p> <ul style="list-style-type: none"> <li>• When there is an adjacent track and men or equipment or other individuals are beyond the farthest rail of the adjacent track or a similar distance if there is not adjacent track</li> <li>• For members of the same crew associated with movement of their engine unless necessary to warn or alert a crew member</li> </ul> <p>Do not sound whistle in designated mechanical servicing and repair facilities, unless for an emergency or when approaching roadway workers.</p>

### 5.8.3 Whistle Failure

If the whistle fails to operate and no other unit can be used as the lead unit, continue movement with the bell ringing continuously. Stop the train before each public crossing, so a crew member on the ground can provide warning until the crossing is occupied, unless:

- Crossing gates are in the fully lowered position.
- or
- No traffic is approaching or stopped at the crossing.

### 5.8.4 Whistle Quiet Zone

Within designated whistle quiet zones, whistle signal (7) must not be sounded approaching public crossings at grade except when:

- Necessary to provide warning in an emergency.
- Notified automatic warning devices are malfunctioning.
- Notified automatic warning devices are out of service.
- or
- The whistle quiet zone is not in effect during specified hours.

**BNSF Amendment—Add the following:**

A locomotive engineer may sound the train horn to provide warning to crews on other trains in an emergency situation, vehicle operators, pedestrians, trespassers or animals if, in the locomotive engineer's sole judgment, such action is appropriate to prevent imminent injury, death, or property damage. Train crews are not restricted from sounding the horn when:

- There is an emergency situation.
- A wayside horn is malfunctioning.
- Active grade crossing warning devices malfunction.
- Grade crossing warning systems are out of service.
- Supplemental or alternative safety measures are not compliant.
- Needed for purposes other than highway-rail crossing safety, for example, to announce the approach of a train to roadway workers.

All other whistle requirements remain in effect.

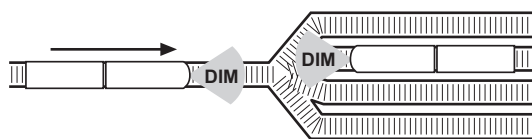
## 5.9 Headlight Display

Turn the headlight on bright to the front of every train, except when the light must be dimmed as outlined in Rule 5.9.1 (Dimming Headlight) or turned off as outlined in Rule 5.9.2 (Headlight Off).

### 5.9.1 Dimming Headlight

Approaching public crossings at grade with engine in front, the headlight must be on bright at the crossing sign. If no sign, or if movement begins between sign and crossing, the headlight must be on bright soon enough before the crossing to provide warning. Except when the engine is approaching and passing over a public crossing at grade, dim the headlight during any of the following conditions:

1. At stations and yards where switching is being done.



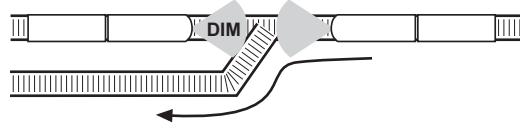
[Diagram A.]

2. When stopped close behind a train.



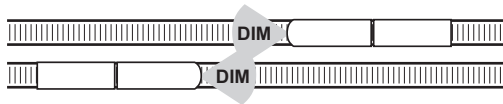
[Diagram B.]

3. When stopped on the main track waiting for an approaching train. However, when stopped in block system limits, turn the headlight off at the radio request of the crew of an approaching train, until the head end of the train passes.



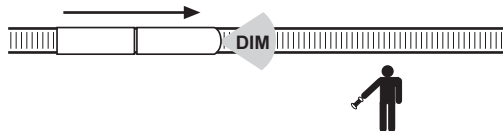
[Diagram C.]

4. When approaching and passing the head end of a train at night.



[Diagram D.]

5. At other times to permit passing of hand signals or when the safety of employees requires.



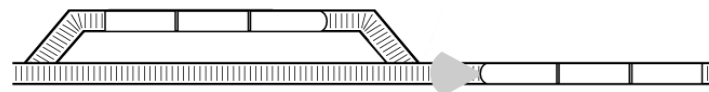
[Diagram E.]

6. When left unattended on a main track in non-sigaled territory.

### 5.9.2 Headlight Off

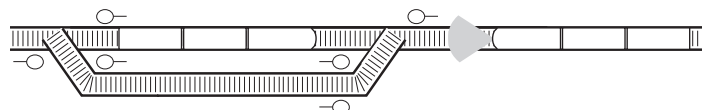
Turn the headlight off under either of the following conditions:

1. The train is stopped clear of the main track



[Diagram A.]

2. The train is left unattended on the main track in block system limit.



[Diagram B.]

### 5.9.3 Headlight Failure

If the headlight on the train fails, ditch lights must be on, when so equipped. Headlight failure must be reported to the train dispatcher.

At night, if headlight and ditch lights fail to operate and no other unit can be used as the lead unit, continue movement with a white light displayed on the lead unit. Stop the train before each public crossing, so a crew member on the ground can provide warning until the crossing is occupied, unless:

- Crossing gates are in the fully lowered position.
- or
- No traffic is approaching or stopped at the crossing.

### 5.9.4 Displaying Headlights Front and Rear

When engines are moving, crew members must turn on the headlight to the front and rear, but may dim or extinguish it on the end coupled to cars.

### 5.9.5 Displaying Ditch Lights

Display ditch lights, if equipped, to the front of the train when headlight is on bright.

Locomotives must not be operated as the lead unit out of a train's initial terminal unless both ditch lights are operating. However, if no units are equipped with ditch lights, do not exceed 20 MPH over public crossings until occupied.

If one ditch light fails enroute, the train may proceed, but repairs must be made by the next daily inspection. If two ditch lights fail enroute, the train may proceed, but not exceeding 20 MPH over public crossings until occupied, but must not travel beyond the first point where repairs may be made or until the next daily inspection, whichever occurs first.

### 5.9.6 Displaying Oscillating White Headlight

If the leading engine is equipped with an oscillating white headlight, turn the light on when the engine is moving. However, turn the light off when meeting trains, passing trains, or during switching operations, unless movement involves public crossings at grade.

### 5.9.7 Displaying Oscillating or Flashing Red Light

If the leading engine is equipped with an oscillating or flashing red light, turn the light on under any of the following conditions:

- Train is stopped suddenly where adjacent tracks may be fouled.
- Head-end protection is required.
- or
- Condition exists that endangers movement.

The red light signals an approaching train on the same or adjacent track to stop at once and to proceed only after the track is safe for train passage. Extinguish red flashing lights when they are no longer needed.

Displaying these lights does not modify the requirements of Rule 6.19 (Flag Protection) or Rule 6.23 (Emergency Stop or Severe Slack Action).

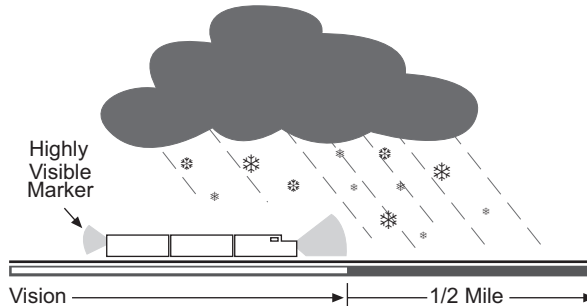
## 5.10 Markers

A marker of the prescribed type must be displayed on the trailing end of the rear car to indicate the rear of the train.

### 5.10.1 Highly Visible Markers

Display a highly visible marker at the rear of every train as follows:

- From 1 hour before sunset to 1 hour after sunrise.
- When weather conditions restrict visibility to less than 1/2 mile.



[Diagram A.]

A marker equipped with a functioning photoelectric cell will automatically illuminate at the appropriate time.

When an engine is operating without cars or is at the rear of the train, the trailing headlight illuminated on dim may be used as a marker.

#### Inspection of Marker

When a highly visible marker is required, a qualified employee must inspect it at the initial terminal and at each crew change point. To determine if the marker is functioning properly, the employee will inspect it by observation or by telemetry display in the cab of the engine. The engineer must be informed of the results of the inspection.

### 5.10.2 Alternative Markers

Display a reflector, red flag, or light fixture at the rear of the train as the marker when any of the following conditions exists:

- A highly visible marker is not required.
  - A defective car must be placed at the rear for movement to a repair point.
  - The rear portion of the train is disabled and cannot be moved, and a highly visible marker cannot be displayed on the rear of the portion to be moved.
- or
- The highly visible marker becomes inoperative enroute. If this occurs, notify the train dispatcher and move the train to the next forward location where the highly visible marker can be repaired or replaced.

## 5.11 Engine Identifying Number

Trains will be identified by initials and engine number, adding the direction when required. When an engine consists of more than one unit or when two or more engines are coupled, the number of one unit only will be illuminated as the identifying number. When practical, use the leading unit.

#### **BNSF Amendment—The following exception is added:**

Exception:

- On track bulletins that advise about excessive dimension equipment, trains may be identified by train symbol.
- On track bulletins and on track warrants that do not convey movement authority, passenger trains may be identified by train symbol.

## 5.12 Protection of Occupied Outfit Cars

This rule outlines the requirements for protecting occupied outfit cars. As used in this rule, the following definitions apply:

**Outfit Car.** Any on-track vehicle, including outfit, camp, or bunk car or modular home mounted on a flat car to house railroad employees. Such equipment is not considered an outfit car when placed in a wreck train.

**Effective Locking Device.** When used in relation to a manually operated switch or a derail, a lock that can be locked or unlocked only by the craft or group of workmen applying the lock.

**Rolling Equipment.** Engines, cars, and one or more engines coupled to one or more cars.

**Switch Providing Direct Access.** A switch that if used by rolling equipment could permit the rolling equipment to couple to the equipment being protected.

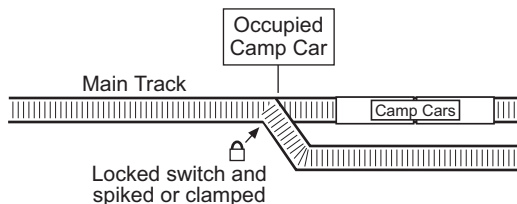
**Warning Signal.** A white sign that reads “OCCUPIED CAMP CAR” in black lettering. At night, an illuminated white light must also be used.

When occupied outfit cars are placed on a track, the employee in charge of the outfit car occupants (or a designated representative) must provide or request protection using one of the following methods:

### A. On a Main Track

One of these two methods or a combination of these methods must be provided:

1. Each manually operated switch that provides direct access to that portion of the main track where occupied outfit cars are located must be lined against movement to that track, secured with an effective locking device, and spiked or clamped. Warning signals must be displayed at or near each switch.



[Diagram A.]

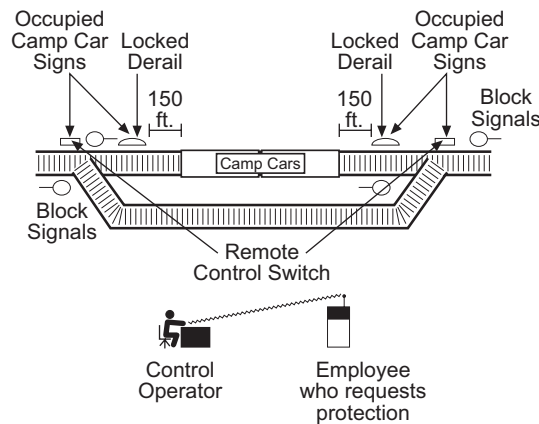
2. If remote control switches provide direct access to the main track where occupied outfit cars are located, the control operator will line the switch against movement to that track and apply blocking devices to the control machine to prevent movement onto that track. The control operator must complete the above tasks before informing the employee requesting protection that protection is provided.

**Blocking devices must not be removed until the employee in charge of the outfit car occupants (or a designated representative) informs the control operator that protection is no longer required.**

- a. Warning signals must be displayed at or near each remote control switch.
- b. In addition, a derail capable of restricting access to the portion of main track where occupied outfit cars are located must be placed at least 150 feet from the end of the occupied outfit cars. The derail must be locked in derailing position with an effective locking device. Warning signals must be displayed at each derail.



- c. The control operator must maintain for 15 days a written record of each notification. The record must contain the following information:
- Name and craft of employee requesting protection.
  - Identification of track protected.
  - Date and time employee in charge of outfit car occupants is notified that protection was provided.
  - Date, time, name, and craft of employee authorizing removal of protection.

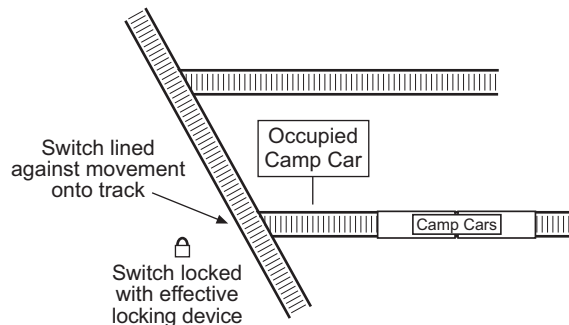


[Diagram B.]

#### B. On Other Than a Main Track

One of these three methods of protection or a combination of these methods must be provided:

1. Each manually operated switch that provides direct access to the track where occupied outfit cars are located must be lined against movement to that track and secured with an effective locking device. Warning signals must be displayed at or near each switch.

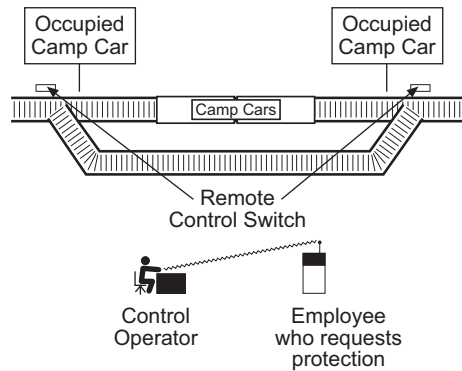


[Diagram C.]

2. If remote control switches provide direct access to the track where occupied outfit cars are located, the control operator will line the switch against movement to that track and apply blocking devices to the control machine to prevent movement onto that track. The control operator must complete the above tasks before informing the employee requesting protection that protection is provided.

**Blocking devices must not be removed until the employee in charge of the outfit car occupants (or a designated representative) informs the control operator that protection is no longer required.**

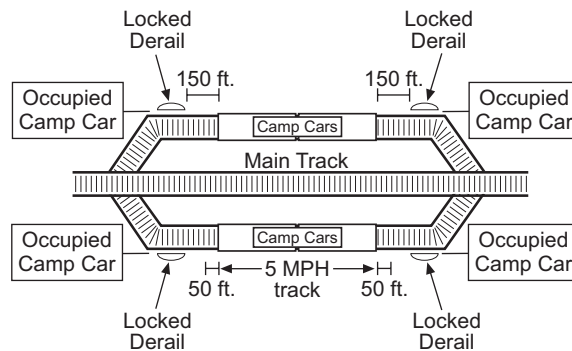
- a. Warning signals must be displayed at or near each remote control switch.



[Diagram D.]

- b. The control operator must maintain for 15 days a written record of each notification. The record must contain the following information:
- Name and craft of employee requesting protection.
  - Identification of track protected.
  - Date and time employee in charge of outfit car occupants is notified that protection was provided.
  - Date, time, name, and craft of employee authorizing removal of protection.
3. A derail capable of restricting access to that portion of the track where occupied outfit cars are located will fulfill the requirements of protection when the derail is:
- a. Positioned at least 150 feet from the end of the occupied outfit cars.
- or
- b. Positioned at least 50 feet from the end of the occupied outfit cars where the maximum speed on that track is 5 MPH.

Warning signals must be displayed at each derail.



[Diagram E.]

### C. Warning Signals

When a warning signal is displayed to protect occupied outfit cars:

1. Occupied outfit cars must not be coupled to or moved.
2. Rolling equipment must not pass the warning signal.
3. Rolling equipment must not be placed on the same track in a manner that would block or reduce the crew's view of the warning signal.

## 5.13 Blue Signal Protection of Workmen

This rule outlines the requirements for protecting railroad workmen who are inspecting, testing, repairing, and servicing rolling equipment. In particular, because these tasks require the workmen to work on, under, or between rolling equipment, workmen are exposed to potential injury from moving equipment.

As used in this rule, the following definitions apply:

**Workmen.** Railroad employees assigned to inspect, test, repair, or service railroad rolling equipment or components, including brake systems. Train and yard crews are excluded, except when they perform the above work on rolling equipment not part of the train or yard movement they are handling or will handle.

- “Servicing” does not include supplying cabooses, engines, or passenger cars with items such as ice, drinking water, tools, sanitary supplies, stationery, or flagging equipment.
- “Testing” does not include an employee making visual observations while on or along side a caboose, engine, or passenger car. Also, testing does not include repositioning the activation switch or covering the photoelectric cell of the marker when the rear of the train is on the main track. The employee inspecting the marker must contact the employee controlling the engine to confirm that the train will remain secure against movement until the inspection is complete.

**Group of Workmen.** Two or more workmen of the same or different crafts who work as a unit under a common authority and communicate with each other while working.

**Rolling Equipment.** Engines, cars, and one or more engines coupled to one or more cars.

**Blue Signal.** During the day, a clearly distinguishable blue flag or light, and at night, a blue light. The blue light may be steady or flashing.

The blue signal does not need to be lighted when it is attached to the operating controls of an engine and the inside of the engine cab area is lighted enough to make the blue signal clearly distinguishable.

**Effective Locking Device.** When used in relation to a manually operated switch or a derail, a lock that can be locked or unlocked only by the craft or group of workmen applying the lock.

**Car Shop Repair Area.** One or more tracks within an area where rolling equipment testing, servicing, repairing, inspecting, or rebuilding is controlled exclusively by mechanical department personnel.

**Engine Servicing Area.** One or more tracks within an area where engine testing, servicing, repairing, inspecting, or rebuilding is controlled exclusively by mechanical department personnel.

**Switch Providing Direct Access.** A switch that if used by rolling equipment could permit the rolling equipment to couple to the equipment being protected.

### A. What a Blue Signal Signifies

A blue signal signifies that workmen are on, under, or between rolling equipment and requires that:

1. Rolling equipment must not be coupled to or moved, except as provided in “**Movement in Engine Servicing Area**” and “**Movement in Car Shop Repair Area**” of this rule.
2. Rolling equipment must not pass a blue signal on a track protected by the signal.
3. Other rolling equipment must not be placed on the same track so as to block or reduce the view of the blue signal.
  - a. However, rolling equipment may be placed on the same track when it is placed on designated engine servicing area tracks or car shop repair area tracks, or when a derail divides a track into separate working areas.

4. Rolling equipment must not enter a track when a blue signal is displayed at the entrance to the track.

Blue signals or remote control blue signals must be displayed for each craft or group of workmen who will work on, under, or between rolling equipment.

**Protection Removed.** Blue signals may be removed only by the craft or group who placed them. Remote control display may be discontinued when directed by the craft or group that requested the protection. When blue signal protection has been removed from one entrance of a double-ended track or from either end of rolling equipment on a main track, that track is no longer under blue signal protection.

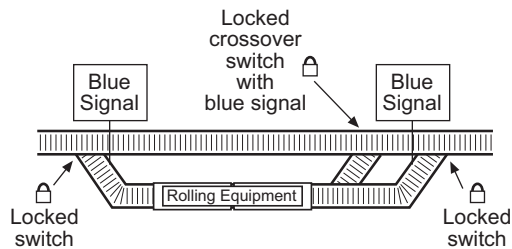
## B. How to Provide Protection

When workmen are on, under, or between rolling equipment and exposed to potential injury, protection must be provided as follows:

**On a Main Track.** A blue signal must be displayed at each end of the rolling equipment.

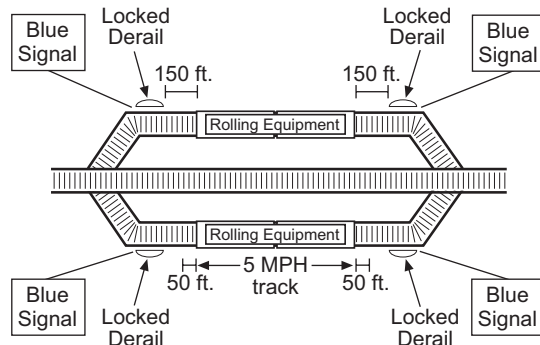
**On Other than a Main Track.** One of these three methods of protection or a combination of these methods must be provided:

1. Each manually operated switch, including any facing point crossover switch that provides direct access must be lined against movement onto the track and secured by an effective locking device. A blue signal must be placed at or near each such switch.



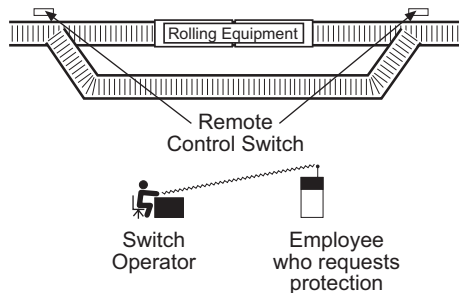
[Diagram A.]

2. A derail capable of restricting access to the track where work will occur must be locked in derailing position with an effective locking device and:
  - a. Positioned at least 150 feet from the rolling equipment to be protected.
  - or
  - b. Positioned at least 50 feet from the end of rolling equipment on a designated engine servicing track or car shop repair track where speed is limited to not more than 5 MPH. A blue signal must be displayed at each derail.



[Diagram B.]

3. Where remote control switches provide direct access, the employee in charge of the workmen must tell the switch operator what work will be done. The switch operator must then:
  - a. Inform the employee in charge of the workmen that the switches have been lined against movement onto the track and devices controlling the switches have been secured.
  - b. Not remove the locking devices unless the employee in charge of the workmen says it is safe to do so.
  - c. Maintain for 15 days a written record of each notification that includes:
    - Name and craft of the employee in charge of the workmen requesting protection.
    - Identification of track involved.
    - Date and time the employee in charge of workmen is notified that protection was provided.
    - Date, time, name, and craft of the employee in charge of workmen who authorized removal of the protection.



[Diagram C.]

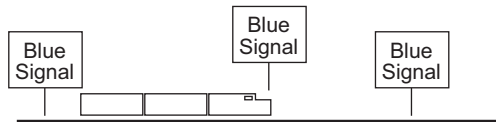
### C. Blue Signal Readily Visible to Engineer

In addition to providing protection as required in “**On a Main Track**” and “**On Other than a Main Track,**” when workmen are on, under, or between an engine or rolling equipment coupled to an engine:

1. A blue signal must be attached to the controlling engine and be visible to the engineer or employee controlling the engine.
2. Engines equipped for remote control operations must be in manual.
3. ~~The engine must not be moved.~~

**BNSF Amendment—Item 3 is changed to read:**

3. The engine must not be moved. The controls must not be changed unless directed by individuals who placed the blue signal protection.



[Diagram D.]

### D. Protection for Workmen Inspecting Markers

Blue signal protection must be provided for workmen when they are:

1. Replacing, repositioning, or repairing a marker, and the rear of the train is on any track.  
or
2. Inspecting a marker by repositioning the activation switch or covering the photoelectric cell, and the rear of the train is on other than a main track.

**E. Protection for Emergency Repair Work on a Main Track**

If a blue signal is not available for employees performing emergency repairs on, under, or between an engine or rolling equipment coupled to an engine on a main track, the employee controlling the engine must be notified and appropriate measures taken to provide protection for the employees.

**F. Movement in Engine Servicing Area**

An engine must not enter a designated engine servicing area until the blue signal protection is removed from the entrance. The engine must stop short of coupling to another engine.

An engine must not leave a designated engine servicing area unless the blue signal is removed from the engine and the track in the direction of movement.

Blue signal protection removed to let engines enter or leave the engine servicing area must be restored immediately after the engine enters or clears the area.

An engine protected by blue signals may be moved on a designated engine servicing area track when:

1. An authorized employee operates the engine under the direction of the employee in charge of workmen.
2. The blue signal has been removed from the controlling engine to be repositioned.
3. Workmen have been warned of the movement.

**G. Movement in Car Shop Repair Area**

When rolling equipment on car shop repair tracks is protected by blue signals, a car mover may reposition the equipment if:

1. Workmen have been warned of the movement.
2. An authorized employee operates the car mover under the direction of the employee in charge of workmen.

**5.13.1 Utility Employees**

This rule outlines the requirements for allowing utility employees to work without blue signal protection. As used in this rule, a Utility Employee is a railroad employee assigned as a temporary member of a train or yard crew.

**A. Requirements to Start Work**

A utility employee may work as a member of only one train or yard crew at a time.

No more than three utility employees may work with one train or yard crew at the same time.

A utility employee may become a member of a train or yard crew under the following conditions:

- The utility employee communicates with the designated crew member of the train or yard crew before starting work. Communication may be conducted verbally or by radio.
- The designated crew member identifies the utility employee to each member of the crew and each crew member acknowledges the utility employee's presence.
- The designated crew member authorizes the utility employee to work as a temporary member of the crew.

**B. Requirements While Working On, Under, or Between**

Before a utility employee may work on, under, or between rolling equipment, the following applies:

- All members of the crew must communicate with each other to understand the work to be done.
- The engineer must be in the cab of the assigned controlling locomotive. However, another member of the same crew may replace the engineer when the locomotive is stationary.

**C. Requirements When Work Ends**

A utility employee is released from a train or yard crew when:

- The utility employee notifies the designated crew member that the work is completed.
- The designated crew member notifies each crew member that the utility employee is being released.
- The designated crew member releases the utility employee from the train or yard crew, after each crew member acknowledges this notice.

## 5.14 Signs Protecting Equipment

When a sign reading:

**STOP—TANK CAR CONNECTED**

**STOP—MEN WORKING**

**EMPLOYEES WORKING**

**SERVICE CONNECTIONS**

or a similar warning is displayed on a track or car, the car must not be coupled to or moved. Other equipment must not be placed on the same track in a manner that would block or reduce the view of the sign.

## 5.15 Improperly Displayed Signals

If a signal is improperly displayed, or a signal, flag, or sign is absent from the place it is usually shown, regard the signal as displaying the most restrictive indication it can give. However, if a semaphore arm is visible, it will govern.

Promptly report improperly displayed signals or absent fixed signals, flags, or signs to the train dispatcher.

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## 6.0 Movement of Trains and Engines

### 6.1 Repeat Instructions

An employee who verbally receives instructions or information about train or engine movements must repeat them.

### 6.2 Initiating Movement

Before initiating movement on a main track, a crew member must:

- ~~Receive a track warrant.~~

**BNSF Amendment—The first bullet is changed to read:**

- Receive a track warrant or general track bulletin.

or

- Determine from the train dispatcher or yardmaster if any track bulletins are needed.

#### 6.2.1 Train Location

~~Trains or maintenance-of-way employees who receive authority to occupy the main track after the arrival of a train or to follow a train must ascertain the train's location by one of the following methods:~~

**BNSF Amendment—The first sentence is changed to read:**

Trains who receive authority to occupy the main track after the arrival of a train or to follow a train must ascertain the train's location by one of the following methods:

- Visual identification of the train.
  - Direct communication with a crew member of the train.
- or
- Receiving information about the train from the train dispatcher or control operator.

### 6.3 Main Track Authorization

Do not occupy main tracks unless authorized by one of the following:

- Rule 6.13 (Yard Limits).
- Rule 6.14 (Restricted Limits).
- Rule 6.15 (Block Register Territory).
- Rule 9.14 (Movement with the Current of Traffic).
- Rule 9.15 (Track Permits).
- Rule 10.1 (Authority to Enter CTC Limits).
- Rule 14.1 (Authority to Enter TWC Limits).
- Rule 14.6 (Movement Against the Current of Traffic).
- Rule 15.3 (Authorizing Movement Against the Current of Traffic).
- Rule 15.4 (Protection When Tracks Removed from Service).
- Rule 16.1 (Authority to Enter DTC Limits).
- At manual interlockings, verbal authority from the control operator or a controlled signal that indicates proceed.
- Special instructions or general order.

When unable to obtain authority and it is necessary to foul or occupy a main track in ABS, protection must be provided in both directions as outlined under Rule 9.17.1 (Signal Protection in ABS by Lining Switch).

Written authorities that are no longer in effect must be retained until the end of tour of duty, unless otherwise instructed by the train dispatcher.

#### **Joint Authority**

~~When a train or employee receives authority joint with employee(s), the train or employee must not occupy the overlapping limits until:~~

- ~~• Working limits are described and permission is received to enter the overlapping limits from the employee(s) listed on the authority.~~
- ~~or~~
- ~~• Advice is received from the train dispatcher or control operator that the employee(s) have reported clear of the limits.~~

**BNSF Amendment—The paragraph titled Joint Authority is deleted, and the following is added:**

#### **Overlapping Limits**

When a train receives track and time, track warrant or track permit authority joint with an employee or OCS permission joint with an employee, the train must not occupy the overlapping limits until permission is received to enter the overlapping limits from the employees listed on the authority or on the OCS permission.

### **6.3.1 Train Coordination**

Train Coordination provides for men or equipment to use a train's authority to establish working limits. The employee must contact the train's engineer to request use of Train Coordination. To establish working limits:

- The train must be in view and stopped.
- The employee in charge of working limits will communicate with the engineer who will notify other crew members that working limits are to be established.
- The engineer will make movements only as permitted by the employee in charge until the working limits have been released to the engineer.
- The train will not release its authority within the limits until those working limits have been released by the employee in charge.

#### **Establish Working Limits**

Working limits may be established within a train's authority limits as follows:

##### **A. DTC or TWC Territory**

1. With a train having authority to move in either direction that is not joint.  
or
2. With a train having authority to move in one direction only, working limits must not be established:
  - Behind the train.
  - More than one block in advance of the train or beyond any location that a train or engine could enter the track between the employee in charge of the working limits and the train.

##### **B. Rule 9.15 (Track Permit)**

With a train having the only track permit authority within the limits.

##### **C. Rule 9.14 (Current of Traffic)**

With a train having authority to move with the current of traffic, working limits must not be established:

- Behind the train.
- More than one block in advance of the train or beyond any location that a train or engine could enter the track between the employee in charge of the working limits and the train.

**D. CTC Territory**

1. With a train having track and time authority that is not joint.  
or
2. With a train having authority to move in one direction only, working limits must not be established:
  - Behind the train.
  - More than one block in advance of the train or beyond any location that a train or engine could enter the track between the employee in charge of the working limits and the train.

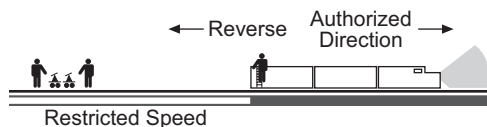
**BNSF Amendment—The following rule is added:****E. Train Coordination - OCS Territory**

Employees may use a train's permission in OCS territory in the same manner as using a train's authority. Working limits may be established within a train's OCS limits as follows:

1. With a train having permission to move in either direction that is not joint,  
or
2. With a train having permission to move in one direction only, working limits must not be established:
  - Behind the train.
  - More than one block in advance of the train or beyond any location that a train or engine could enter the track between the employee in charge of the working limits and the train.

**6.4 Reverse Movements**

Make reverse movements on any main track, controlled siding, or on any track where a block system is in effect at restricted speed and only within the limits a train has authority to occupy the track.



[Diagram A.]

**6.4.1 Permission for Reverse Movements**

Obtain permission from the train dispatcher or control operator before making a reverse movement, unless the movement is within the same signaled block.

When a train or engine is advised that working limits have been established behind their train, obtain permission from the employee in charge to make any reverse movements, including within the same signaled block.

**6.4.2 Movements Within Control Points or Interlockings****A. Control Points or Manual Interlockings**

Except within track and time limits, if movement stops while the trailing end is between the outer opposing absolute signals of a control point or manual interlocking, the movement must not change direction without permission from the control operator.

**B. Automatic Interlockings**

At an automatic interlocking, the movement may change direction within the limits of the interlocking if it continuously occupies at least one car length of the limits.

## 6.5 Shoving Movements

### **BNSF Amendment—Entire rule is changed to read:**

Cars or engines must not be shoved until the engineer knows who is protecting the movement and how protection will be provided. The employee providing protection for the movement shall not engage in any task unrelated to the movement.

When cars or engines are shoved, crew member must be in position and provide visual protection unless relieved by:

- Local instructions for tracks equipped with shove lights/cameras.
- Special instructions specific to tracks involved.
- Rule 6.6 (Picking Up Crew Member).
- Pullout move within an activated Remote Control Zone (RCZ)

Minimum requirements when radio communication is used during shoving movements:

- Direction will be described in relationship to the front of the controlling locomotive (F stencil).
- To instruct the engineer to move the locomotive forward use “ahead”.
- To instruct the engineer to move the locomotive backward use “backup”.
- To instruct the engineer to stop, use the word “stop”.
- Communicate distance using 50 feet as a standard for one car length.
- Engineer must acknowledge the distance, when more than four cars.

Movement must be stopped within half of the distance specified unless additional instructions are received.

Note: Employees are encouraged to communicate additional information related to shoving movements (e.g. switch / derail position, close clearance conditions, stop signals, authority limits, etc).

When cars or engines are shoved on a main track or controlled siding in the direction authorized, movement must not exceed:

- 20 MPH for freight trains.
- 30 MPH for passenger trains.

When engaged in snow plow operations:

- One common authority may be used by both maintenance of way employees and the train crew when all employees are on the equipment,
- Maximum timetable speed applies unless a higher speed is authorized by the employee in charge.
- Employees are relieved from providing visual protection for snow plow being shoved.

Cars or engines must not be shoved to block other tracks until it is safe to do so.

### 6.5.1 Remote Control Movements

Remote control movements are considered shoving movements, except when the remote control operator controlling the movement is riding the leading engine in the direction of movement. Before initiating movement, the remote control operator or a crew member must be in position to visually observe the direction the equipment moves.

#### **Relief of Providing Protection**

The remote control operator is relieved from providing protection and the requirement to stop within half the range of vision for movements with engine on leading end when:

1. The remote control zone has been activated.
2. Switches/derails are known to be properly lined.
3. Track(s) within the zone are known to be clear of other trains, engines, railroad cars, and men or equipment fouling track.

This must be repeated each time the remote control zone is activated.

## 6.6 Picking Up Crew Member

A train may back up on any main track or on any track where CTC is in effect to pick up a crew member under the following conditions:

1. The train dispatcher gives permission to make the movement and verifies the following:
  - a. Another authority is not in effect within the same or overlapping limits unless conflicting movements are protected.
  - b. A track bulletin Form B is not in effect within the same or overlapping limits.
  - c. A main track is not removed from service by a track bulletin within the same or overlapping limits.
2. Movement is limited to the train's authority.
3. Movement does not enter or foul a private or public crossing except as provided by Rule 6.32.1 (Providing Warning Over Road Crossings).
4. Movement will not be made into or within yard limits, restricted limits, interlocking limits, drawbridges, railroad crossings at grade, or track bulletin Form B limits.
5. Movement does not exceed the train's length.

**BNSF Amendment—The following paragraph is added:**

Before a crew requests and makes a move under this rule, a job safety briefing between crew members must be conducted that includes:

- Confirmation of authority limits.
- Location of nearest affected road crossings in direction of movement.
- Distance to be shoved.
- Confirmation that train is intact, verified either visually or by determining that brake pipe continuity exists using end-of-train device or distributed power telemetry.

When movement is made under these conditions, restricted speed does not apply. Trains backing up under the provisions of this rule may pass signals indicating Stop and Proceed, without stopping.

## 6.7 Remote Control Zone

### A. Entering Remote Control Zone

Before entering a remote control zone, all employees that are not part of the remote control crew must determine whether the zone is activated. Employees may receive this information from the remote control operator, other authorized employee, or special instructions.

~~When the remote control zone is activated, track(s) within the zone must not be fouled with equipment, occupied, or switches operated until the remote control zone has been deactivated or permission is granted by the remote control operator to enter the remote control zone.~~

**BNSF Amendment—The 2nd paragraph is changed to read:**

When the remote control zone is activated, track(s) within the zone must not be fouled with equipment, occupied, or switches operated until the remote control zone has been deactivated.

~~Protection must be provided while other employees are in the remote control zone. The remote control operator must know the track is clear and switches are properly lined after other employees are clear of the remote control zone.~~

**BNSF Amendment—The 3rd paragraph is deleted in its entirety.**

### B. Transfer of an Active Remote Control Zone

An active remote control zone may be transferred to other remote control operators. A job briefing must be conducted each time the zone is transferred between remote control operators and, if applicable, other authorized employee.

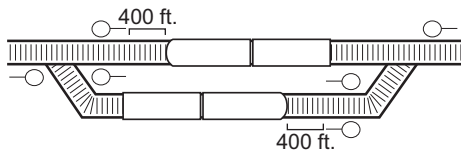
**C. Deactivating Remote Control Zone**

When the remote control operator ends the tour of duty, the remote control zone must be deactivated except the remote control zone may remain active if:

- Transferred.
- or
- Special instructions specify the hours the remote control zone is active.

**6.8 Stopping Clear for Meeting or Passing**

A train that may be met or passed must stop at least 400 feet from the signal or clearance point of the facing point switch the other train will pass over, if length of train permits.



[Diagram A.]

**6.9 Meeting or Passing Precautions**

A train required to take siding must stop clear of the switch, unless the switch is properly lined to leave the main track.

A train standing on the main track to meet an opposing train must, if possible, line the switch for the opposing train to leave the main track. However, within ABS, do not line the switch until the opposing train has entered the block in advance.

**6.10 Instructions to Clear a Following Train**

If the train dispatcher instructs a train within block system limits to clear a following train, the train must be in the clear before the following train could receive a restrictive signal indication.

Determine the location of the following train by radio or other means of communication.

**6.11 Mandatory Directive**

Mandatory directives are written, printed, or displayed authorities or speed restrictions issued by the train dispatcher or control operator. Mandatory directives are:

- Track warrants.
- Track bulletins.
- DTC authority.
- Track and time.
- Track permits.
- Radio speed restrictions.

A mandatory directive restricting a train's movement will not be issued near a point where the restriction applies until the engineer or conductor confirms that the train can comply with the restriction.

Indicate "VOID" on mandatory directive form when:

- Employee reports clear of authority limits,
- or
- Mandatory directive is made void

Crew must retain mandatory directives for continuous tour of duty.

## 6.12 FRA Excepted Track

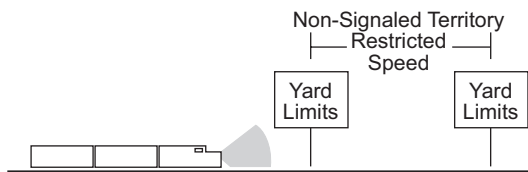
On a track designated as “FRA Excepted Track,” the following will govern:

- Maximum speed must not exceed 10 MPH.
- No occupied passenger train will be operated.
- No movement will be operated that contains more than five cars placarded according to Hazardous Material Regulations.

## 6.13 Yard Limits

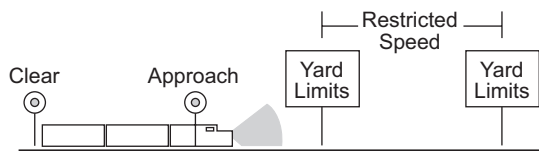
Within yard limits, trains or engines are authorized to use the main track not protecting against other trains or engines, only after obtaining a track warrant, listing all track bulletins that affect their movement. Engines must give way as soon as possible to trains as they approach. Engines must keep posted as to the arrival of passenger trains and must not delay them.

All movements entering or moving within yard limits must be made at restricted speed unless operating under a block signal indication that is more favorable than Approach.

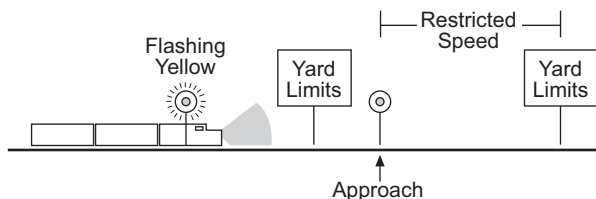


[Diagram A.]

Upon observing or having advance knowledge that a block signal may require restricted speed due to yard limits, if entering or within yard limits, the movement must be at restricted speed at that block signal, or as soon as possible thereafter, consistent with good train handling.



[Diagram B.]



[Diagram C.]

Yard limits remain in effect continuously unless otherwise specified by special instructions or track bulletin.

**Against the Current of Traffic**

Movements against the current of traffic must not be made unless authorized or protected by track warrant, track bulletin, yardmaster, or other authorized employee.

**In CTC Territory**

Where yard limits are in effect in CTC territory, the control operator must authorize any movement on the main track. Reverse movements within the same block may be made as outlined in Rule 6.4.1 (Permission for Reverse Movements).

**In Track Permit Territory**

Where yard limits are in effect in Rule 9.15 (Track Permit) territory, all movements must receive permission from the control operator to enter the main track or to cross over from one main track to another as follows:

- A controlled signal displays a proceed indication.
- A track permit is issued.
- or
- Verbal permission is granted if no track permit is in effect. Rule 9.17 (Entering Main Track at Hand-Operated or Spring Switch) applies.

**6.14 Restricted Limits**

Between designated points specified by signs and in the special instructions, trains and engines are authorized to use the main track not protecting against other trains or engines, only after obtaining a track warrant, listing all track bulletins that affect their movement. All movements must be made at restricted speed.

Movements against the current of traffic must not be made unless authorized or protected by track warrant, track bulletin, yardmaster, or other authorized employee.

**6.15 Block Register Territory (BRT)**

Block register territory will be designated in the special instructions. A register labeled “Block Register Territory” will apply only on that designated territory. A train or employee in charge of men or equipment is authorized to occupy block register territory under the following conditions:

- The following information is in the register on first blank line:

Train, gang, or equipment identification	Conductor or employee in charge of men or equipment	Date	Time territory occupied	Time territory cleared
A	B	C	D	E

**Column      Required Entry**

- A ..... Enter the train, gang, or equipment identification.
- B ..... Enter last name of conductor or employee in charge of men or equipment.
- C ..... Enter current date.
- D ..... Enter time entry is made in register.
- E ..... Enter time the territory was cleared. Then, draw a line through the entire entry.  
The required exit entry may be completed by any authorized employee.

- If the register indicates the territory is occupied, entry cannot be made on the register until the employee in charge or engineer of each preceding entry has been contacted. When the territory is jointly occupied, movements must be made at restricted speed.



## 6.16 Approaching Railroad Crossings, Drawbridges, and End of Multiple Main Track

Trains and engines must be prepared to stop when they approach railroad crossings at grade, drawbridges, and the end of multiple main track, unless these areas are protected by block or interlocking signals.

### Protected by Stop Signs

If stop signs protect these areas, the train must stop before any part of the train or engine passes the stop sign. The train cannot proceed until the route is clear or drawbridge position permits movement.



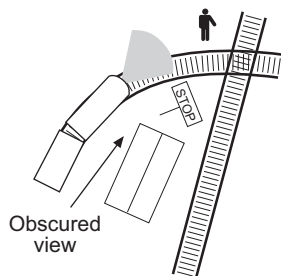
[Diagram A.]

### Protected by Gate

If a gate is lined against the intended route, trains and engines must stop and remain at least 50 feet from fouling the track on the conflicting route until the gate is changed to the stop position on the conflicting route. Where required, restore gate to its normal position after movement is complete.

### Obscured View of Conflicting Route

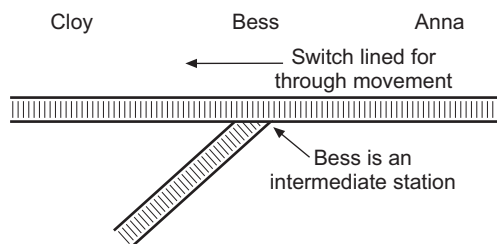
If a train must stop before entering a railroad crossing at grade and the view on the conflicting route is obscured, a crew member must go ahead of the train and signal from the crossing when it is safe to proceed.



[Diagram B.]

## 6.17 Switches at Junctions

The normal position for a junction switch is for through movement on the main track where the junction is an intermediate station



[Diagram A.]

## 6.18 Stopping Clear of Crossings and Junctions

At a railroad crossing or junction, a train or engine must not stop, if possible, where it could interfere with train movement on the other track.

## 6.19 Flag Protection

### A. Flag Protection Not Required

Flag protection is not required against following trains on the same track if:

1. Train is within ABS limits and the rear of the train is protected by at least two block signals or one block signal and one distant signal.
  2. Rear of the train is within BRT, CTC, DTC, TWC or interlocking limits.
- or
3. General order or special instructions specify that flag protection is not required.

### B. Flag Protection is Required

When flag protection is required against following trains:

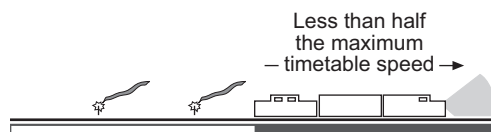
#### 1. More Than Half the Maximum Timetable Speed

When a train is moving on a main track at or more than half the maximum authorized timetable speed for any train at that location, and the train may be overtaken by a following train, a flagman must decide whether to drop lighted fuses by considering the following:

- Grade of the track.
- Curvature of the track.
- Weather conditions.
- Sight distance.
- Speed of the train relative to a following train.

#### 2. Less than Half the Maximum Timetable Speed

When a train is moving on a main track at less than half the maximum authorized timetable speed for any train at that location, a flagman must provide flag protection against following trains on the same track. The flagman must drop off single lighted fuses at close enough intervals to ensure full protection and not exceed the burning time of the fusee.



[Diagram A.]

#### 3. Stopped on a Main Track

When a train stops on a main track, a flagman must immediately go back at least 1 mile. Flagman must remain there until stopping a following train or until recalled.

If the flagman is recalled and safety will permit, the flagman must leave a lighted fusee and return to the train. If recalled before reaching the prescribed distance, the flagman must leave a lighted fusee. While returning to the train, the flagman must also place single lighted fusees at intervals shorter than the burning time of the fusee.

When the train departs, a crew member must leave one lighted fusee. In addition, until the train is moving at least half the maximum authorized timetable speed for any train at that location, a crew member must drop off single lighted fusees at intervals shorter than the burning time of the fusee.

## 6.20 Equipment Left on Main Track

### A. Portion of Train Left on Main Track

When necessary to leave a portion of a train temporarily on the main track, follow this procedure:

- Set a sufficient number of hand brakes to keep the detached portion from moving.
- Provide protection against movements that may enter the main track between the detached portion and the returning front portion unless:
  - The train dispatcher verbally relieves the protection.
  - or
  - The return movement is otherwise authorized.
- Make return movement at restricted speed. However, an engine without cars may return at a higher speed when governed by block signal indication.

### B. Other Equipment Left on Main Track

Crews that leave equipment on the main track do not need to provide protection for the equipment if the train dispatcher gives verbal relief.

The train dispatcher may request a crew to report clear of their authority and leave equipment on a main track. Crews that leave equipment on a main track do not need to provide protection for the equipment if the train dispatcher provides relief. The train dispatcher must provide protection for the equipment.

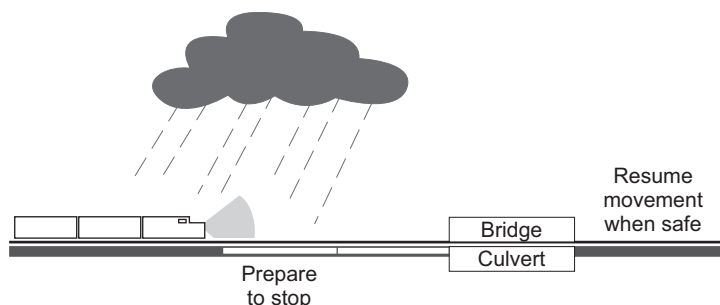
All crews that use the main track at that point must be notified of the equipment location and must move at restricted speed when approaching that location.

## 6.21 Precautions Against Unusual Conditions

Protect trains and engines against any known condition that may interfere with their safety.

When conditions restrict visibility, regulate speed to ensure that crew members can observe and comply with signal indications.

In unusually heavy rain, storm, or high water, trains and engines must approach bridges, culverts, and other potentially hazardous points prepared to stop. If they cannot proceed safely, they must stop until it is safe to resume movement.



[Diagram A.]

Advise the train dispatcher of such conditions by the first available means of communication.

### 6.21.1 Protection Against Defects

If any defect or condition that might cause an accident is discovered on tracks, bridges, or culverts, or if any crew member believes that the train or engine has passed over a dangerous defect, the crew member must immediately notify the train dispatcher and provide protection if necessary.

### 6.21.2 Water Above Rail

Do not operate trains and engines over tracks submerged in water until the track has been inspected and verified as safe.

Operate engines at 5 MPH or less when water is above the top of the rail. If water is more than 3 inches above the top of the rail, a mechanical department supervisor must authorize the movement.

## 6.22 Maintaining Control of Train or Engine

Crew members must consider train or engine speed, grade conditions, and air gauge indications to determine that the train or engine is being handled safely and is under control. If necessary, take immediate action to bring the train or engine under control.

## 6.23 Emergency Stop or Severe Slack Action

When a train or engine is stopped by an emergency application of the brakes or severe slack action occurs while stopping, take the following actions:

### Obstruction of Main Track or Controlled Siding

If an adjacent main track or controlled siding may be obstructed, immediately:

- Warn other trains by radio, stating the exact location and status of the train and repeat as necessary.
- Place lighted fusees on adjacent tracks.
- Notify the train dispatcher or control operator and, when possible, foreign line railroads if necessary.

Warning to other movements is no longer necessary when:

- It is known adjacent tracks are not obstructed.
- or
- The train dispatcher or control operator advises the crew that protection is provided on adjacent tracks.

### Inspection of Cars and Units

- All cars, units, equipment, and track must be inspected as outlined in the:
  - Special Instructions.
  - Air Brake and Train Handling Rules.

#### **BNSF Amendment—The following is added:**

The following trains are relieved of visual inspection required by an emergency application when it is known that the brake pipe pressure has been restored by observing the caboose gauge, end-of-train telemetry device (ETD) or distributed power telemetry before proceeding:

- Solid loaded bulk commodity trains,
- Any train where emergency application of the brakes occurs at a speed above 30 MPH,
- or
- Any train that is 5000 tons or less.

If physical characteristics prevent a complete visual inspection, inspect as much of the train as possible. The train may then be moved, but may not exceed 5 MPH for the distance necessary to complete the inspection, and must be stopped immediately if excessive power is required to start or keep the train moving.

### Train on Adjacent Track

A train on an adjacent track that receives radio notification must pass the location specified at restricted speed and stop short of any portion of the stopped train fouling their track. When advised that the track is clear and it is safe to proceed, this restriction no longer applies.

## 6.24 Movement on Double Track

On double track, trains must keep to the right unless otherwise instructed.

## 6.25 Movement Against the Current of Traffic

Movements against the current of traffic must be authorized by track bulletin or track warrant, except as provided by:

- Rule 6.13 (Yard Limits).
- Rule 6.14 (Restricted Limits).
- Rule 9.15 (Track Permits).
- Rule 9.17.1 (Signal Protection in ABS by Lining Switch).

or

- Rule 16.1 (Authority to Enter DTC Limits).

Movements must approach block and interlocking signals prepared to stop unless signals indicate proceed.

When a facing point movement will be made over a spring switch, comply with Rule 8.9.1 (Testing Spring Switch).

## 6.26 Use of Multiple Main Tracks

Multiple main tracks will be designated by name or number. When necessary, track use will be indicated in the special instructions.

## 6.27 Movement at Restricted Speed

When required to move at restricted speed, movement must be made at a speed that allows stopping within half the range of vision short of:

- Train.
- Engine.
- Railroad car.
- Men or equipment fouling the track.
- Stop signal.

or

- Derail or switch lined improperly.

When a train or engine is required to move at restricted speed, the crew must keep a lookout for broken rail and not exceed 20 MPH.

Comply with these requirements until the leading wheels reach a point where movement at restricted speed is no longer required.

## 6.28 Movement on Other than Main Track

Except when moving on a main track or on a track where a block system is in effect, trains or engines must move at a speed that allows them to stop within half the range of vision short of:

- Train.
- Engine.
- Railroad car.
- Men or equipment fouling the track.
- Stop signal.

or

- Derail or switch lined improperly.

**6.28.1 Sidings of Assigned Direction**

Do not use sidings of an assigned direction in the opposite direction unless authorized by the train dispatcher.

**6.28.2 Stopping Clear in Siding**

When possible, a train entering a siding must not stop until the entire train is clear of the main track.

**6.28.3 Cars or Equipment Left on Siding**

Avoid leaving cars or equipment on sidings unless authorized by the train dispatcher, except in an emergency. In this case, notify the train dispatcher immediately.

**6.29 Inspecting Trains****6.29.1 Inspecting Passing Trains**

Employees must inspect passing trains. If they detect any of the following conditions, they must notify crew members on the passing train by any available means:

- Overheated journals.
- Sticking brakes.
- Sliding wheels.
- Wheels not properly positioned on the rail.
- Dragging equipment.
- Insecure contents.
- Signs of smoke or fire.
- Headlight or marker improperly displayed.
- Any other dangerous condition.

When possible, employees inspecting the passing train must advise crew members of the condition of their train.

When possible, a crew member on the engine of the train being inspected must notify a crew member on the rear of the train when the train is being inspected by other employees.

**Ground Inspections**

~~When a train is stopped and is met or passed by another train, crew members must inspect the passing train. The trainman's inspection must be made from the ground if there is a safe location. If safe to do so, a trainman must cross the track and inspect the side of the passing train opposite the stopped train.~~

**BNSF Amendment—The paragraph Ground Inspections is changed to read:**

When a train is stopped and is met or passed by another train, crew members must inspect the passing train. The trainman's inspection must be made from the ground if there is a safe location.

- Dismount equipment on the side opposite approaching train.
- Do not cross adjacent tracks solely for the purpose of inspecting a passing train.
- During inclement weather, crew members may remain in the locomotive cab when inspecting passing trains.

### **Trackside Warning Detectors and Inspections**

Crew members must be aware of trackside warning detectors and signals from persons inspecting their train. Stop the train immediately for an inspection when any of the following conditions exist:

- A crew member receives a stop signal.
- A trackside warning detector indicates a train defect.
- or
- A crew member is notified of a dangerous condition.

Movement must not proceed until it is safe.

## **6.29.2 Train Inspections by Crew Members**

When a walking inspection of the train is required, and physical characteristics prevent a complete train inspection, inspect as much of the train as possible. The train may then be moved, but may not exceed 5 MPH for the distance necessary to complete the inspection.

While their train is moving, crew members must inspect it frequently and look for indications of defects in the train, especially when rounding curves.

When inspecting their train, crew members must observe the train closely for any of the following:

- Overheated journals.
- Sticking brakes.
- Sliding wheels.
- Wheels not properly positioned on the rail.
- Dragging equipment.
- Insecure contents.
- Signs of smoke or fire.
- Any other dangerous condition.

Crew members who discover defects while the train is moving must stop the train promptly and correct any defects, if possible. If the defective car must be set out, they must not attempt to move the car to the setout point unless it is safe to do so.

When a car is set out because of an overheated journal, any fire must be completely extinguished and precautions taken to prevent further ignition.

## **6.30 Receiving or Discharging Passengers**

### **A. Passenger Crew Responsibilities**

When approaching a station to receive or discharge passengers, determine if the train is routed on the track nearest the station platform. If other trains could pass on a main track or controlled siding between the passenger train and the station platform:

- Communicate with the train dispatcher to determine whether any trains are approaching between the train and the station platform.
- Do not make the station stop until assured that trains will not pass between the train and the station platform.

If unable to communicate with the train dispatcher, the station stop may be made after the crew determines that no trains are approaching on the track between the train and the station platform. Before making the station stop, the conductor must assign crew member responsibilities to ensure passenger safety. If during the station stop a train is seen or heard approaching, crew members must take immediate action to keep passengers from fouling the affected track.

**B. Responsibilities of Approaching Movements**

When notified that a passenger train will be at a station, do not pass between station platform and a passenger train until assured that all passengers and employees have cleared the track between the passenger train and the station platform. Movement may then pass when preceded by an employee walking ahead of the movement.

**C. Other than Main Track Movements**

A movement must not pass between a passenger train and the station platform being used unless safeguards are provided.

**6.31 Maximum Authorized Speed**

Conductors and engineers are jointly responsible for knowing and not exceeding the maximum authorized speed for their train. Passenger speed is applicable only to trains consisting entirely of passenger equipment.

When possible, crew members must notify the train dispatcher promptly of any condition that will delay or prevent their train from making the usual speed.

**6.31.1 Permanent Speed Restrictions**

Permanent speed restrictions must not be exceeded until the rear of the train clears the limits of the restriction, unless otherwise specified.

**6.32 Road Crossings****6.32.1 Providing Warning Over Road Crossings**

When cars are shoved, kicked or a gravity switch move is made over road crossings at grade, an employee must be on the ground at the crossing to provide warning until crossing is occupied. Make any movement over the crossing only on the employee's signal.

Warning is not required when crossing is equipped with:

- Gates that are fully lowered.

or

- Flashing lights or passive warning devices when it is clearly seen that no traffic is approaching or stopped at the crossing. Shoving movements must not exceed 15 MPH over crossing until occupied.

**6.32.2 Automatic Warning Devices**

Under any of the following conditions, a movement must not foul a crossing equipped with automatic warning devices until the device has been operating long enough to provide warning and the crossing gates, if equipped, are fully lowered:

- Movement has stopped within 3,000 feet of the crossing.
- Movement is within 3,000 feet of the crossing and speed has increased by more than 5 MPH.
- Movement is closely following another movement.
- Movement is on other than the main track or siding.

or

- Movement enters a main track or siding within 3,000 feet of the crossing.

**Employees must observe all automatic warning devices and report any that are malfunctioning to the train dispatcher or proper authority by the first available means of communication. Notify all affected trains as soon as possible.**



**A. Automatic Warning Devices Malfunctioning**

Use the following table to properly complete movement over the crossing:

<b>Movement When Notified that Automatic Warning Devices have an Activation Failure, are Disabled or Malfunctioning</b>	
<b>If ...</b>	<b>Then ...</b>
The crew is notified that the crossing warning system has an activation failure or that the crossing warning system has been disabled and an equipped flagger is not at the crossing to provide warning.	Stop before occupying crossing. After a crew member is on the ground at the crossing to warn highway traffic, proceed over the crossing as directed by that crew member. Then proceed at normal speed.
The crew is notified that the crossing warning system is malfunctioning, and an equipped flagger is not at the crossing to provide warning.	Stop before occupying crossing. After a crew member is on the ground at the crossing to warn highway traffic, proceed over the crossing as directed by that crew member,  or  If devices are seen to be working or when instructed by the train dispatcher or proper authority, proceed with caution over the crossing at 15 MPH without stopping until the head end of the train completely occupies the crossing. Then proceed at normal speed.
The crew communicates with a flagger prior to fouling the crossing and receives confirmation that warning is being provided by at least one equipped flagger who is unable to provide warning in all directions of approaching traffic.	Proceed over the crossing at 15 MPH without stopping until the head end of the train completely occupies the crossing. Then proceed at normal speed.
The crew communicates with a flagger prior to fouling the crossing and receives confirmation that warning is being provided by one or more equipped flaggers who are able to provide warning in all directions of approaching traffic.	Proceed over the crossing at normal speed without stopping.
NOTE: An equipped flagger is a person other than a crew member who is equipped with an orange vest, orange shirt or orange jacket. At night, the vest, shirt or jacket must be fluorescent. The flagger must have a red flag or stop paddle by day and a light at night.	

When advised by the train dispatcher or proper authority that the automatic warning devices are repaired or returned to service, these restrictions no longer apply.

**B. Whistle for Crossing**

When notified that automatic warning devices are malfunctioning, sound whistle signal 5.8.2(7) regardless of any prohibition.

**BNSF Amendment—The following rule is added:****C. Power Off Indicators**

When the power off indicators on the side of signal housings at highway crossings are flashing or not illuminated, immediately notify the train dispatcher.

### 6.32.3 Providing Warning for Adjacent Tracks

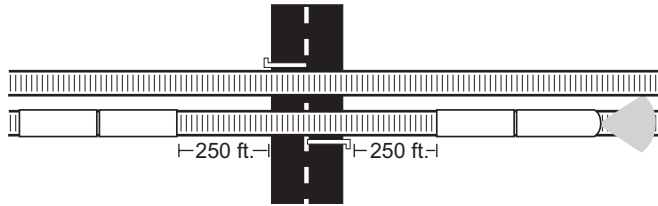
When practical, position an employee on the ground to warn traffic against movements approaching on adjacent tracks, under either of the following conditions:

- A train or cut of cars is parted closer than 250 feet from a road crossing.
- The head-end of a train is stopped closer than 250 feet from a road crossing.

### 6.32.4 Clear of Crossings and Signal Circuits

Leave cars, engines, or equipment clear of road crossings and crossing signal circuits.

When practical, avoid leaving cars, engines, or equipment standing closer than 250 feet from the road crossing when there is an adjacent track.



[Diagram A.]

### 6.32.5 Actuating Automatic Warning Devices Unnecessarily

Avoid actuating automatic warning devices unnecessarily by leaving switches open or permitting equipment to stand within the controlling circuit. If this cannot be avoided and if the signals are equipped for manual operation, a crew member must manually operate the signal for movement of traffic. A crew member must restore signals to automatic operation before a train or engine occupies the crossing or before it leaves the crossing.

### 6.32.6 Blocking Public Crossings

When practical, a standing train or switching movement must avoid blocking a public crossing longer than 10 minutes.

## **7.0 Switching**

### **7.1 Switching Safely and Efficiently**

While switching, employees must work safely and efficiently and avoid damage to contents of cars, equipment, structures, or other property.

Do not leave equipment standing where it will foul equipment on adjacent tracks or cause injury to employees riding on the side of a car or engine.

On tracks where clearance point is indicated, leave equipment beyond the clearance point.

If the clearance point is not indicated or visible, determine the clearance point by standing outside the rail of adjacent track and extend arm towards the equipment. When unable to touch the equipment, leave equipment at least an additional 50 feet into the track to ensure equipment is beyond the clearance point.

Equipment may be left on a:

- Main track, fouling a siding switch, when the switch is lined for the main track.
- Siding, fouling a main track switch, when the switch is lined for the siding.
- Yard switching lead, fouling a yard track switch when the switch is lined for the yard switching lead.
- or
- Industry track beyond the clearance point of the switch leading to the industry.

### **7.2 Communication Between Crews Switching**

To avoid injury or damage where engines may be working at both ends of a track or tracks, crews switching must have a clear understanding of movements to be made.

### **7.3 Additional Switching Precautions**

The following equipment must not be unnecessarily switched or couplings made so as to damage the equipment or load:

- Passenger or outfit cars.
- Intermodal or TOFC cars.
- Cabooses.
- Multi-level loads.
- Cars containing livestock.
- Open top loads subject to shifting.

The following equipment must not be cut off in motion or struck by any car moving under its own momentum:

- Passenger cars.
- Outfit cars.
- High-value loads.
- Engines.
- Loaded depressed-center flat cars.
- Cars loaded with modular housing units.
- Articulated and solid drawbar-connected cars with more than two car bodies. However, when empty, these cars may be kicked but not humped.
- Scale test cars.
- Roadway equipment.

## **7.4 Precautions for Coupling or Moving Cars or Engines**

Before coupling to or moving cars or engines, verify that the cars or engines are properly secured and can be coupled and moved safely.

Make couplings at a speed of not more than 4 MPH. Stretch the slack to ensure that all couplings are made.

## **7.5 Testing Hand Brakes**

Employees must know how to operate the type of brakes they are using. When hand brakes must control or prevent car movement, test the brakes to ensure that they are operating properly before using them.

## **7.6 Securing Cars or Engines**

~~Do not depend on air brakes to hold a train, engine, or cars in place when left unattended. Apply a sufficient number of hand brakes to prevent movement. If hand brakes are not adequate, block the wheels.~~

**BNSF Amendment—The first paragraph is changed to read:**

Do not depend on air brakes to hold a train, engine or cars in place when left unattended. Engineer and conductor are jointly responsible, through job briefing, to ensure equipment left unattended is properly secured and a sufficient number of hand brakes are applied to prevent movement. If handbrakes are not adequate, block the wheels.

When the engine is coupled to a train or cars standing on a grade, do not release the hand brakes until the air brake system is fully charged.

When cars are moved from any track, apply enough hand brakes to prevent any remaining cars from moving.

## **7.7 Kicking or Dropping Cars**

~~Kicking cars is permitted only when it will not endanger employees, equipment, or contents of cars.~~

~~Dropping cars is prohibited.~~

**BNSF Amendment—Entire rule is changed to read:**

Kicking cars is permitted only when it will not endanger employees, equipment or content of cars. Dropping cars is permitted only on territory where specifically authorized by individual subdivision special instructions.

Before dropping cars, crew members must fully understand the intended movement. They must verify that the track is sufficiently clear and that switches and hand brakes are in working order. If possible, the engine must run on straight track. Cars must not be dropped over spring switches or dual control switches.

### **7.7.1 Gravity Switch Moves**

Unless otherwise restricted, a gravity switch move may be utilized where cars must be repositioned on the opposite end of the engine. Not more than five cars may be handled at one time.

When making a gravity switch move:

- Hand brakes must be tested to insure proper operation.
- Sufficient hand brakes must be manned by crew members to insure that the movement can be controlled and stopped.
- Using the hand brake on cars with shiftable loads must be avoided when practical.
- Cars must not be allowed to couple to other equipment.

## 7.8 Coupling or Moving Cars on Tracks Where Cars are Being Loaded or Unloaded

Before coupling to or moving cars on tracks where cars are being loaded or unloaded, crew members must be sure that all of the following have been removed or cleared:

- Persons in, on, or about cars.
- Platforms.
- Boards.
- Tank car couplings and connections.
- Conveyors.
- Loading or unloading spouts and similar appliances or connections.
- Vehicles.
- Other obstructions.

In addition:

- Be careful to avoid damage to freight of partly loaded cars.
- Do not handle cars that are improperly or unevenly loaded if load could shift or fall from the car, or if the car could derail or overturn.
- Return any car placed for loading or unloading to the location it was found if it has not been released for movement.
- Do not pull empty cars from an unloading facility until any major accumulation of debris is removed.
- Ensure that plug-type and swinging doors on cars are properly closed or secured. However, crew members must not attempt to close those doors. If plug door is found open enroute, car may continue in the train to the next location where mechanical forces are available to close door.

## 7.9 Switching Passenger or Occupied Outfit Cars

Before switching passenger equipment or occupied outfit cars:

- Couple the air hoses.
- Fully charge the brake system.
- Use the automatic brake valve when switching.

When coupling passenger or outfit cars:

- Stop the movement approximately 50 feet before the coupling is made.
- Have an employee on the ground direct the coupling.
- Ensure couplers are fully compressed and stretched to ensure that knuckles are locked before making:
  - Air connections
  - Steam connections
  - Electrical connections

## 7.10 Movement Through Gates or Doorways

Before moving engines, cars, or other equipment through gates, doorways, or similar openings, stop to ensure that the gates, doorways, or openings are completely open and secure. When overhead or side clearances are close, make sure movement is safe. ~~Do not ride on side of a car, engine or other equipment when moving through gates, doorways or similar openings.~~

**BNSF Amendment—The last sentence is changed to read:**

Do not ride on side of a car, engine or other equipment when moving through gates, doorways or similar openings where close clearance exists.

## 7.11 Charging Necessary Air Brakes

Do not handle cars without charging the air brake system, unless the cars can be handled safely and stopped within the required distance. If necessary, couple the air hoses and charge the brake systems on a sufficient number of cars to control movement.

## 7.12 Movements Into Spur Tracks

When shoving cars into a spur track, control movement to prevent damage at the end of the track, and do the following:

- Stop movement 150 feet from the end of the track.
- Apply hand brakes, when necessary, to control slack.
- Have a crew member precede any further movement when it can be done safely.
- Move only on the crew member's signal.

## 7.13 Protection of Employees in Bowl Tracks

During humping operations, before a train or yard crew member goes between engines or cars on a bowl track to couple air hoses or adjust coupling devices, or before an employee performs maintenance on a bowl track, protection must be provided against cars released from the hump into the track as follows:

- The employee requesting protection must notify the employee controlling the switches that provide access from the hump to the track where the work will occur.
- After being notified, the switch controller must line any remote control switch against movement to the affected bowl track and apply a locking or blocking device to the control for that switch.
- The switch controller must then notify the employee that protection is provided. Protection will be maintained until the switch controller is advised that work is complete and protection is no longer required.

## 8.0 Switches

### 8.1 Hand Operation of Switches

Spring or dual control switches operated by hand are considered hand-operated switches, and all rules governing hand-operated switches apply.

### 8.2 Position of Switches

The employee handling the switch or derail is responsible for the position of the switch or derail in use. The employee must not allow movement to foul an adjacent track until the hand-operated switch is properly lined.

Do not operate switch that is tagged. If the switch is spiked, do not remove the spike unless authorized by the same craft or group that placed it.

Employees handling switches and derails must make sure:

- The switches and derails are properly lined for the intended route.
- The points fit properly and the target, if so equipped, corresponds with the switch's position.
- When the operating lever is equipped with a latch, they do not step on the latch to release the lever except when throwing the switch.
- After locking a switch or derail, they test the lock to ensure it is secured.
- The switch is not operated while equipment is fouling, standing on, or moving over the switch.
- When equipment has entered a track, the switch to that track is not lined away until the equipment has passed the clearance point of the track.

When possible, crew members on the engine must see that the switches and derails near the engine are properly lined.

### 8.3 Main Track Switches

The normal position of a main track switch is for main track movement, and it must be lined and locked in that position. At points where double track begins, the normal position of a spring switch is for movement with the current of traffic.

However, the main track switch may be left open:

- In CTC territory within track and time limits.
- When attended by a crew member or switch tender.
- During switching operations when it is certain that no other train or engine will pass over the switch.
- For another train or engine when the switch is attended by a member of that crew.
- Within ABS limits when instructed by the train dispatcher at:
  - The entering switch of a siding in Rule 9.14 (Movement with the Current of Traffic) territory.
  - Either switch of a siding in Rule 16.1 (Authority to Enter DTC Limits) territory.

- Within TWC territory when authorized by track warrant. Track warrant protection must be provided for this condition. The switch must not be considered restored to normal position until the train dispatcher is notified by an employee or train at that location.

or

- Within ABS-TWC, ABS-DTC, or Rule 9.14 (Movement with the Current of Traffic) territory at the entering switch of a siding after the following has been done:
  1. Communication has been established between crews of trains meeting or passing.
  2. An understanding has been reached that the train on the main track will stop and restore the switch to the normal position. A crew member must not report clear of the limits until it is known the switch is lined and locked in the normal position.

On main track switches (if equipped), the target will be red if the switch is lined in other than its normal position.

Before leaving the location where a hand-operated main track switch was operated:

- Crew members must confirm the position of the switch with each other.
- Engineering Department employees granted authority to enter working limits must confirm the position of the switch with the employee in charge or a designated employee who will notify the employee in charge.

## 8.4 Lining Main Track Switch

When an employee lines the switch to let a train enter or leave the main track, the employee must then go to the opposite side of the main track and not return to the switch stand until movement is complete. If unable to go to the opposite side of the track, the employee must stand at least 20 feet from the switch stand.

## 8.5 Clearing Main Track Before Restoring Switch

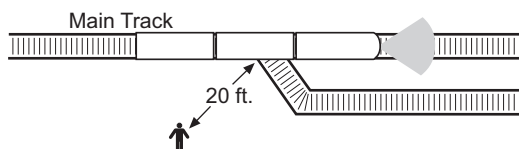
Do not return a main track switch to the normal position until movement is clear of the main track.

## 8.6 Restoring Switch to Normal Position

An employee getting off moving equipment to return the main track switch to normal position must, when possible, get off the equipment on the opposite side from the switch stand.

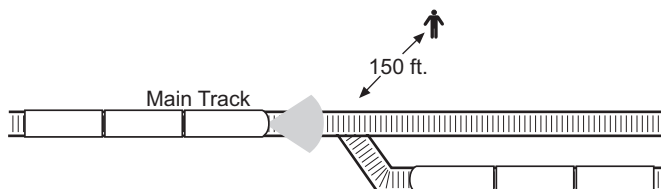
## 8.7 Clear of Main Track Switches

Except in switching movements, when a train or engine is approaching or passing on a main track, employees must not go nearer than 20 feet to any main track switch.



[Diagram A.]

When a train or engine that will be met or passed is on a siding or other track, the employee attending the switch must be in a safe location. The employee must not be nearer than 150 feet, if possible, from the switch when the train is closely approaching and passing.



[Diagram B.]



### Inspecting Hand-Operated Switches in Non-Signaled Territory

In non-signaled territory, if the expected train is not closely approaching, a crew member will inspect facing point, hand-operated switches the train will pass over to determine that the:

- Switches are lined for the intended route.
- Switch points fit properly.
- Switch lever is secured.

## 8.8 Switches Equipped with Locks, Hooks or Latches

When not in use, switches must be locked, hooked, or latched if so equipped. Before making movements in either direction over these switches, make sure the switch is latched or secured by placing the lock or hook in the hasp. However, when making train movements in facing point direction, lock the switches equipped with a lock.

Replace any missing or defective switch locks. If they cannot be replaced, report the condition at once to the train dispatcher, yardmaster, or supervisor in charge, and spike the switch if possible.

## 8.9 Movement Over Spring Switches

Spring switches are identified by the letters S or SS, special targets, signs, and/or lights.

### 8.9.1 Testing Spring Switch

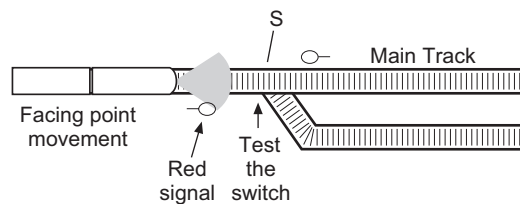
A crew member tests the switch by lining the switch over and back by hand and examining the switch points to see that they fit properly.

Before a train or engine makes a facing point movement over a spring switch, the switch must be tested when any of the following conditions exist:

1. A block signal governing movement over the switch indicates:
  - Stop.
  - Stop and Proceed.

or

  - Restricted Proceed.



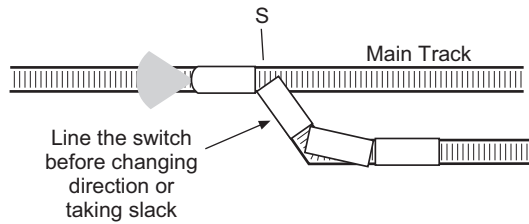
[Diagram A.]

2. A switch point indicator protecting the switch indicates Stop and Inspect Switch.
- or
3. The switch is not protected by a block signal or switch point indicator.

The switch does not need to be tested if it has been lined for the diverging route or written instructions advise the crew that the spring switch has been spiked.

### 8.9.2 Trailing Through and Stopping on a Spring Switch

A train or engine trailing through and stopping on a spring switch must control the slack. A crew member must line the switch by hand before the train or engine can change direction or take slack.

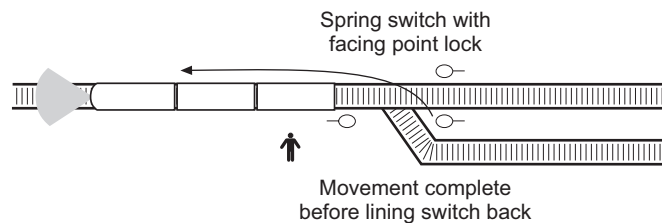


[Diagram A.]

### 8.9.3 Hand Operating a Spring Switch Before Making a Trailing Movement

#### A. With Facing Point Lock

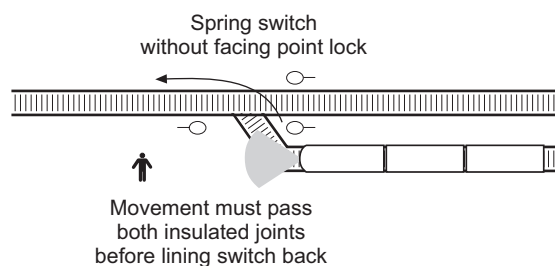
When a train is stopped by a signal governing trailing movement through a spring switch and the switch is equipped with a facing point lock, operate the switch by hand. Do not return the switch to normal position until after movement is complete.



[Diagram A.]

#### B. Without Facing Point Lock

Before a train makes a trailing movement through a spring switch not equipped with a facing point lock, and only hand operation can establish block signal protection, line the switch for the intended route. Return the switch to normal position after leading wheels have passed both insulated joints.



[Diagram B.]

### 8.9.4 During Snow or Ice Storms

During snow storms, ice storms, or other conditions that may prevent a spring switch from functioning properly, avoid making a trailing movement through the spring switch until the switch has been lined by hand for the movement.

### 8.9.5 Spiking Spring Switch

A spring switch that is spiked must be protected.

### 8.9.6 Approaching a Spring Switch in Non-Signaled Territory

A train in non-signaled territory must approach the facing points of a spring switch prepared to stop until:

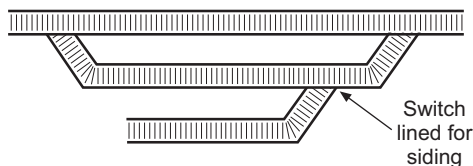
- A switch point indicator shows that the switch is properly lined.
- or
- A distant signal displays clear.

## 8.10 Switch Point Indicator

Aspect	Indication
Green.....	Switch points fit properly in normal position.
Yellow.....	Switch points fit properly in reverse position.
Red or Dark.....	Stop and inspect switch.

## 8.11 Switches in Sidings

The normal position of switches connecting any track, except the main track, to a siding is lined and locked or secured for movement on the siding.



[Diagram A.]

## 8.12 Hand-Operated Crossover Switches

The normal position of crossover switches is for other than crossover movement. The crossover switches must be left lined in normal position, except when they are in use for crossover movements. Both switches of a crossover shall be properly lined before equipment begins a crossover movement. A crossover movement shall be completed before either switch is restored to normal position, except when one crew is using both tracks connected by the crossover during continuous switching operations.

In Rule 6.14 (Restricted Limits), Rule 6.28 (Movement on Other than Main Track) or non-signaled Rule 6.13 (Yard Limits) territory, crossover switches may be left out of correspondence while providing blue signal or inaccessible track protection. When protection is no longer required the crossover switches connected to a main track or siding must be left lined for other than crossover movement. Crossover switches not connected to a main track or siding must be left in a corresponding position.

In signaled territory, crossover switches may be out of correspondence while performing maintenance, testing or inspection.

### **8.13 Scale Track Switches**

When scales are not in use, line switches for dead rails where provided.

### **8.14 Conflicting Movements Approaching Switch**

When conflicting movement is closely approaching a switch, the track must not be fouled or the switch operated. Except at a spring switch, trains must not foul a main track or signaled track or pass beyond an insulated joint at the clearance point until the switch connected with the movement is properly lined.

Crossover switches must not be unlocked or lined for crossover movement when another movement is approaching or passing over either switch.

### **8.15 Switches Run Through**

Do not run through switches, other than spring switches or variable switches. If a rigid type switch is run through, it is unsafe and must be protected by spiking the switch, unless a trackman or other employee takes charge.

An engine or car that partially runs through a switch must continue movement over the switch. The engine or car must not change direction over a damaged switch until it has been spiked or repaired.

### **8.16 Damaged or Defective Switches**

Report a switch that is damaged or defective to the train dispatcher, yardmaster, or supervisor in charge. Tag the switch, spike it if necessary, unless trackman or other employee takes charge. If the switch cannot be made safe, provide protection at once.

### **8.17 Avoid Sanding Over Moveable Parts**

When possible, avoid using sand over moveable parts of an interlocking, retarders, spring switches, variable switches, or power-operated switches.

### **8.18 Variable Switches**

Trailing point movements may be made over a variable switch from either track, regardless of the position of the switch points.

When making a trailing point movement and the switch is not lined for such movement, make sure all wheels of the leading car or unit clear the switch points before changing direction.

During snow storms, ice storms, or other conditions that may prevent a variable switch from functioning properly, avoid making a trailing point movement through a variable switch until it has been lined by hand for movement.

### **8.19 Automatic Switches**

The location of automatic switches will be designated in the timetable. When movement authority requires a train to stop at an Automatic Switch location, stop must be made before any part of a train passes the signal governing movement over the Automatic Switch. To operate an automatic switch to enter the siding, a crew member must do the following:

- Stop the leading end of movement within 200 feet of the absolute signal that governs movement over the switch.
- Operate the push button on the signal mast.

After 40 seconds, the signal will display a restricting indication when the switch is lined for movement into the siding.

When the signal that governs movement over an automatic switch displays a Stop indication, the switch must be operated by hand before proceeding.

**Operating an Automatic Switch by Hand**

To operate an automatic switch by hand, the crew member must stop the train for the signal that governs movement over the switch and then do the following:

- Unlock the switch lock.
- Place the selector lever in the HAND position.
- Operate the hand throw lever until the switch points move when the lever is moved.
- Line the switch for the intended route.
- Do not return the selector lever to the POWER position until at least one unit or car has passed over the switch.

After switch is placed in hand position, signal governing movement over the switch will display Stop indication and movements will be governed by hand signals.

When the switch is returned to the POWER position and movement over the switch is complete, the switch will automatically return to its normal position.

**Entering Main Track.** A train that is about to enter the main track and is authorized to proceed must move past the overlap sign. Further movement must not be made until the signal governing movement over the switch displays a proceed indication. If the signal does not display a proceed indication within 5 minutes, a crew member must operate the switch by hand as specified in Rule 9.17 (Entering Main Track at Hand- Operated or Spring Switch), waiting an additional 5 minutes, if necessary.

**When automatic switches are operated by hand, all rules governing hand-operated switches apply, except cars must not be dropped over the switches.**

**BNSF Amendment—The following paragraph is added:**

In non-signaled territory, when movement continues beyond an automatic switch signal displaying a Stop indication, train must move at restricted speed for two miles or until leading wheels pass the next automatic switch signal or opposing distant signal.

**8.19.1 Radio Controlled Switches**

The location of radio controlled switches and operating instructions will be designated in the timetable and special instructions.

**8.20 Derail Location and Position**

Employees in train, engine, and yard service must know the location of all fixed derails. A train or engine moving on or entering tracks where fixed derails are located, must stop at least 100 feet from derail in derailing position. Movement must not continue until the derail is placed in the non-derailing position. However, the distance restriction will not apply in engine servicing areas.

Do not make a movement over a derail in derailing position.

Sidings having hand-thrown derails will have derail locked in non-derailing position, except when engines or cars are left unattended on siding. On auxiliary tracks other than siding, except when derails are placed in non-derailing position to permit movement, make sure they are always in derailing position regardless of whether cars are on the track they are protecting. Lock all derails equipped with a lock.

Derails that are used in conjunction with Rule 5.12 (Protection of Occupied Outfit Cars), Rule 5.13 (Blue Signal Protection of Workmen), or roadway worker protection must be in the derailing position only when their use is required for such protection. When their use is not required for protection:

- Remove portable derails.
- or
- Lock fixed derails in non-derailing position with an effective locking device.

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## 9.0 Block System Rules

### 9.1 Signal Aspects and Indications

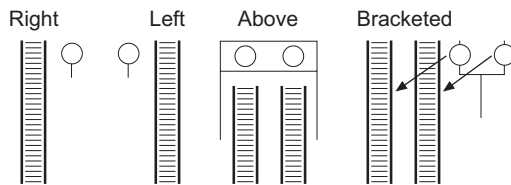
Distant, block, and interlocking signal aspects and indications are shown in the special instructions.

Signal aspects are identified by the position of semaphore arms, color of lights, flashing of lights, position of lights, or any combination. Aspects may be qualified by marker plate, number plate, letter plate, or marker light.

Signals may display color light aspects or semaphore arms and color lights.

### 9.2 Location of Signals

When viewed from the train, block and interlocking signals are generally to the right of the track. However, they may be located to the left or above the track. To display indications for two tracks, two bracketed signals may be located on a supporting mast. The signal to the right governs the track to the right, and the signal to the left governs the track to the left.

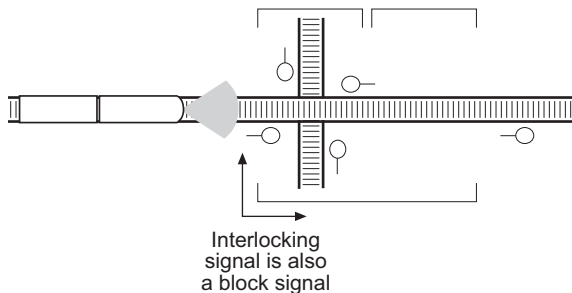


[Diagram A.]

### 9.3 What Signals Govern

Block signals, cab signals, or both govern the use of blocks.

Interlocking signals govern the use of interlocking routes. Where a track is signaled beyond the interlocking limits in the direction of movement, the interlocking signal is also a block signal.



[Diagram A.]

All other rules, where required, remain in effect when complying with the indication of block and interlocking signals.

### 9.4 Improperly Displayed Signals or Absent Lights

Except as shown in block, cab, and interlocking signal aspects in the special instructions, if a light is absent, a white light is displayed where a colored or lunar light should be, or additional colored or lunar lights are displayed, regard a block or interlocking signal as displaying the most restrictive indication it can give. However, when the semaphore arm position is plainly seen, that aspect will govern.

## 9.5 Where Stop Must Be Made

When movement is being made beyond a block signal requiring a train to be prepared to stop at the next signal, the stop must be made before any part of a train passes the block signal requiring the train to stop.

If a train overruns any block signal that requires it to stop, the crew must:

- Warn other trains at once by radio.
- Stop the train immediately.
- Report it to the train dispatcher.

### 9.5.1 Changing Established Route

Except to avoid an accident, after a controlled signal has been cleared for a closely approaching train, the control operator must not change the signal before the approaching train's engineer has assured the control operator that he can comply with the signal change. Do not establish or authorize a conflicting route until communicating with the approaching train's crew and ensuring that the train has stopped clear of the conflicting route.

The control operator must not establish a conflicting route into an occupied block or interlocking limits, or authorize a conflicting movement, unless it is safe to do so.

The control operator must avoid operating the device controlling a switch, derail, movable point frog, or lock when any portion of a train is on or closely approaching the equipment.

### 9.5.2 Protection if Signal Appliance or Track is Damaged

If a signal or signal appliance functions improperly or the track is damaged, signals that govern movements on affected routes must display a Stop indication. No movements on such routes may be permitted until track and signal appliances are examined and movement can occur safely.

### 9.5.3 Protection During Repairs

Within CTC limits or within manual interlocking limits (unless track bulletin Form B is in effect), when a switch, movable point frog, derail, or signal is under repair or is disconnected, or when the track is obstructed or removed from service, display Stop indications for all affected routes. In addition, block or mark any controls to prevent their operation.

Maintenance forces must contact the control operator before beginning repairs, disconnecting equipment, obstructing the track, or removing the track from service. Switches, movable point frogs, and derails must be spiked or secured in the required position if any movement over them occurs before repairs are complete.

### 9.5.4 Authority to Proceed

Except when a signal is used to provide protection within CTC limits or at manual interlockings, control operators must not give hand signals or verbally authorize movement beyond a Stop indication when a proceed indication can be displayed for the movement.

At manual interlockings, control operators must give hand signals so that crew members can understand the signals and know which train they are intended for.

### 9.5.5 Reporting Delays

When a controlled signal displays a proceed indication, notify the control operator immediately if movement cannot occur promptly.



### 9.5.6 Track Occupancy Indicator

Where track occupancy indicators are located, employees must observe the indication before fouling a circuit or changing the derail or a main track switch.

When an occupied indication is displayed, trains or equipment must not foul the main track unless movement is properly protected.

Track occupancy indications do not authorize movement or relieve employees from protecting movements as required by the rules.

## 9.6 Change of Signal Indication

If a signal displaying a proceed indication changes to an indication requiring a train to stop, the train must stop at once. Report such a signal change to the train dispatcher.

## 9.7 Failure to Display Most Restrictive Indication

When a block is occupied, or when a switch protected by a signal is changed from its normal position and that signal fails to display its most restrictive indication, regard the signal as displaying Stop. The train must stop immediately, and employees must warn others by radio of the exact location and status of the train. Contact the train dispatcher or control operator and do not move the train without permission.

## 9.8 Next Governing Signal

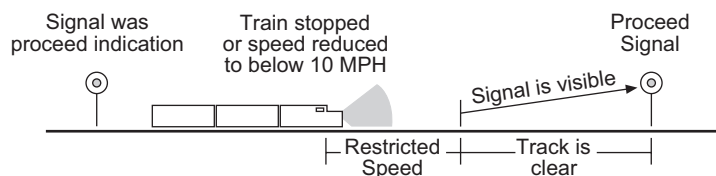
A train may comply with the next signal's indication when its aspect can be clearly seen and the signal governs the track where movement is occurring or will be made. This does not apply when a rule or previous signal indication requires movement at restricted speed.

## 9.9 Train Delayed Within a Block

If a train has entered a block on a proceed indication that does not require restricted speed, and the train stops or its speed is reduced below 10 MPH, the train must:

### A. ABS

Proceed at restricted speed. The train must maintain this speed until the next signal is visible, that signal displays a proceed indication, and the track to that signal is clear.



[Diagram A.]

### B. CTC or Manual Interlocking Limits

Proceed prepared to stop at the next signal until the next signal is visible and that signal displays a proceed indication.

### C. ACS

Operate according to cab signal indication.

### 9.9.1 Approach to Automatic Interlocking

A train must proceed prepared to stop at the interlocking signal when:

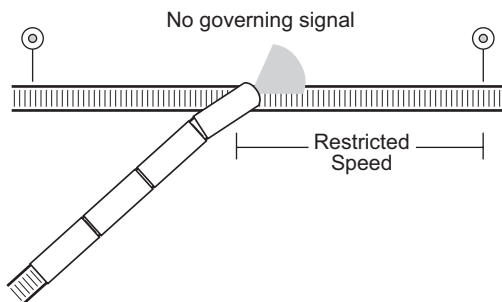
- Moving below 25 MPH and passing a signal that governs the approach to an automatic interlocking.
- or
- Speed is reduced below 25 MPH after passing a signal that governs the approach to an automatic interlocking.

The train must continue to move prepared to stop at the interlocking signal until the train reaches a point approximately 1,000 feet from that signal. If the interlocking signal then indicates proceed, the train may resume speed.

## 9.10 Initiating Movement Between Signals

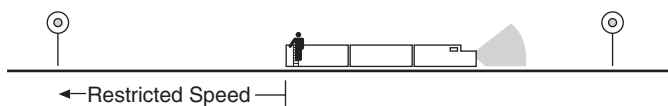
When one of the following occurs, move at restricted speed until the leading wheels have passed the next governing signal or the end of the block system:

- The train enters a block with no governing signal.



[Diagram A.]

- The previous signal indication is unknown.
- Movements in the opposite direction from which the block was entered.



[Diagram B.]

#### Exception

If a train is within ACS or ATC territory with operative cab signals, the train may operate according to the cab signal indication.

## 9.11 Movement from Signal Requiring Restricted Speed

When a train passes a signal requiring movement at restricted speed, the train must move at restricted speed until its leading wheels have passed the next governing signal or the end of the block system.

#### BNSF Amendment—Entire rule is changed to read:

When a train passes a signal requiring movement at restricted speed, the train must move at restricted speed until its leading wheels have passed the next governing signal. When leaving block system limits, trains operating on the main track must move at restricted speed for two miles or until leading wheels pass the opposing distant signal.

## 9.12 Stop Indications

### 9.12.1 CTC Territory

At a signal displaying a Stop indication, if no conflicting movement is evident, the train will be governed as follows:

- A crew member must immediately contact the control operator, unless the train is:
  - Within track and time limits
  - or
  - Entering track and time limits from any point other than either end of track and time limits.
- Before authorizing the train to proceed, the control operator must know that the route is properly lined and no conflicting movement is occupying or authorized to enter the track between that signal and the next absolute signal governing movement or the end of CTC where applicable.
- When the train receives these instructions, “After stopping, (train) at (location) has authority to pass signal displaying Stop indication,” specifying the route where applicable. The train must move at restricted speed.

#### Exception

**Conflicting Movement.** When the control operator has stopped a conflicting movement, he may then authorize another train to proceed in the same limits, advising both crews of movement to be made. If the stopped movement is later permitted to proceed, that train must move at restricted speed until its leading wheels have passed the next governing signal or the end of the block system.

### 9.12.2 Manual Interlockings

At a signal displaying a Stop indication, if no conflicting movement is evident, the train will be governed as follows:

- A crew member must immediately contact the control operator.
- Before authorizing the train to proceed, the control operator must know that the route is properly lined and no conflicting movement is occupying or authorized to enter the track between that signal and the next absolute signal governing movement or the end of interlocking limits where applicable.
- The control operator may authorize the train to proceed using hand signals or the following instructions, “After stopping, (train) at (location) has authority to pass signal displaying Stop indication,” specifying the route where applicable. The train must move at restricted speed.
- If the signal governs movement over a drawbridge, a crew member must verify that the bridge is in the proper position for the train to pass.

Before proceeding into or continuing in CTC territory, the manual interlocking control operator must be sure that the CTC control operator has given authority to proceed.

#### Exception

**Conflicting Movement.** When the control operator has stopped a conflicting movement, he may then authorize another train to proceed, advising both crews of movements to be made. If the stopped movement is later permitted to proceed, that train must move at restricted speed until its leading wheels have passed the next governing signal or the end of the block system.

### 9.12.3 Automatic Interlockings

At a signal displaying a Stop indication, the crew will be governed by instructions in the release box, special instructions, or other instructions. After complying with the instructions that allow the train to proceed, if signal continues to display a Stop indication, the train must move at restricted speed. However, if there is a conflicting movement, the train must not proceed until the movement has passed or stopped, and both crews agree on the next movement.

### 9.12.4 ABS Territory

At a signal displaying a Stop indication outside interlocking limits, the train will be governed as follows:

#### A. Main Track

On a main track, except where Rule 9.14 (Movement with the Current of Traffic) is in effect, after stopping, a train authorized beyond the signal must comply with one of the following procedures:

1. Proceed at restricted speed, if authority beyond the signal is joint with other trains or employees.
2. Proceed at restricted speed to permit an engine, with or without cars, to couple to its train or to a standing cut of cars, if the track between the engine and cars is clear.
3. Proceed at restricted speed when a crew member has contacted the train dispatcher and obtained permission to pass the Stop indication. However, if the train dispatcher cannot be contacted, move 100 feet past the signal, wait 5 minutes, then proceed at restricted speed.

#### B. Movement with the Current of Traffic

On a main track where Rule 9.14 (Movement with the Current of Traffic) is in effect, after stopping, a crew member must contact the train dispatcher or control operator and obtain permission to pass the Stop indication, then proceed at restricted speed. However, if the signal governs movement to a single main track, comply with Rule 9.17 (Entering Main Track at Hand-Operated or Spring Switch), then proceed at restricted speed.

#### C. Siding or Other Track

If the signal governs movements from a siding or other track to the main track, comply with Rule 9.17 (Entering Main Track at Hand-Operated or Spring Switch), then proceed at restricted speed.

## 9.13 When Instructed to Operate Dual Control Switches by Hand

If the control operator cannot line the dual control switch to the desired position, or the control machine does not indicate that the switch is lined and locked, the control operator must authorize movement past the Stop indication and instruct the employee to operate the switch by hand. Movement may then proceed to that switch.

Before passing over the switch, the train must stop and the employee must operate the switch by hand as outlined in Rule 9.13.1 (Hand Operation of Dual Control Switches). After at least one unit or car has passed over the switch points, the employee must return the switch to power unless otherwise instructed by the control operator.

### 9.13.1 Hand Operation of Dual Control Switches

An employee must get permission from the control operator to operate a dual control switch by hand. Operate the switch as follows:

- Unlock the switch lock.
- Place the selector lever in the HAND position or remove the hand crank from the holder.
- Operate the hand throw lever until the switch points are seen to move when the lever is operated, even if the switch is lined for the intended route.
- Line the switch for the intended route, or insert the crank on the shaft and turn the crank as far as it will turn until the switch is in the desired position. Remove the crank from the shaft, but do not return it to the crank holder.
- Return the switch to power by restoring the selector lever to the POWER or MOTOR position and lock. Or, return the crank to the holder and secure it with the switch lock. Notify the control operator after power to the switch is restored.

When the selector lever is in the HAND position or the crank has been removed from the holder, signals governing movements over the switch will display Stop indication, and movements will be governed by hand signals. Notify the engineer, if possible, when the switch is in hand operation and when it has been restored to power operation.

For other types of switch machines, follow the above procedure using the instructions for operation posted at the switch or by special instructions.

## 9.14 Movement with the Current of Traffic

On tracks designated in the timetable, trains will run with the current of traffic, if the train dispatcher gives verbal authorization or a controlled signal indicates proceed.

### 9.14.1 Reporting Clear of a Track Having a Current of Traffic

A train without a crew member on the rear and operating on a track having a current of traffic may report clear of the limits or report having passed a specific location only when it is known the train is complete. This must be determined by one of the following ways:

- The rear of the train has a rear-end telemetry device, and air pressure on the head-end device indicates brake pipe continuity.
- An employee verifies the marker is on the rear of the train.
- A crew member can observe the rear car of the train on which the marker is placed.
- The train is stopped and an inspection verifies that the marker is on the rear car of the train.
- A trackside warning detector transmits an axle count for the train, and axle count duplicates the axle count transmitted by the previous trackside warning detector.

In addition, a train clearing in a siding or other track must comply with requirements outlined in Rule 8.3 (Main Track Switches) before reporting clear of the limits.

## 9.15 Track Permits

On tracks designated in the timetable, a track permit will authorize a train, track car, machine, or employee to occupy the main track or tracks between specific points. The track permit must be issued by a designated control operator under the direction of the train dispatcher. Within these limits, movements may be made in either direction according to signal indication.

Limits designated by a switch extend only to the signal governing movement over the switch, unless otherwise designated.

A train must obtain authority to pass a controlled signal displaying Stop indication to enter track permit limits. Within track permit limits a train, after stopping, may pass a signal displaying Stop indication at restricted speed without further authority, except when signal governs movement at an interlocking.

### 9.15.1 Issuing Track Permits

The track permit may only be issued when:

- Limits are clear.
  - Limits are occupied by the train, track car, machine, or employee who will receive the track permit.
  - Limits are occupied by a train, track car, machine, or employee holding a track permit.
- or
- All trains moving on signal indication without a track permit have passed the location where the track will be fouled.

The track permit limits must be protected by controlled signals. The designated control operator must know the following before issuing a track permit:

- Each controlled signal protecting the limits displays a Stop indication.
- Marking or blocking devices prevent displaying signals for movement into the limits.
- The designated control operator and each control operator who controls signals to protect the limits understand the limits, have provided protection, and have recorded the track permit on the prescribed form.

#### Track Permit Acknowledgment

Track permit authority must be recorded and repeated to the control operator. Acknowledgment must be received before being acted upon.

The control operator must maintain a record of the authority granted.

#### More than One Track Permit

If more than one track permit is in effect at any time within the same limits, all affected trains or employees must be notified.

Trains must move at restricted speed within these limits.

### 9.15.2 Clearing Track Permits

Marking or blocking devices must not be changed or removed until the limits have been released to the control operator.

Track permit limits must be cleared and reported clear to the control operator before time expires. If the track permit is released before time expires, all equipment must be clear of the limits and reported clear to the designated control operator. However, if no other track permit has been granted within the same limits, the train may request release of the track permit. Signal indications will then govern the train if the control operator verbally authorizes the release, specifying direction of movement if required.

When necessary to modify the expiration time, an employee and the control operator must communicate before the time expires to adjust the time granted. If the employee cannot contact the control operator and the time limit expires, authority is extended until the control operator is contacted.

Employees reporting clear of track permit authority must state:

- Their name or other identification.
- Track permit number being released.
- Limits being released.

**BNSF Amendment—The following 4th bullet is added:**

- Position of hand operated main track switches.

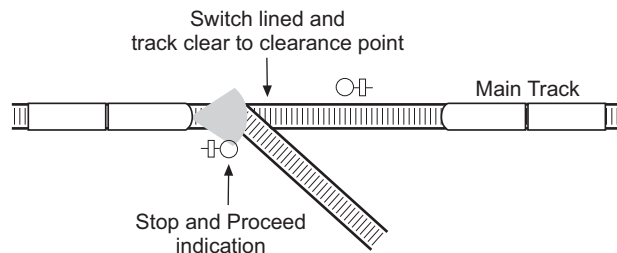
**Releasing Portion of Limits**

When a crew member informs the control operator that the authority is released between two specific points, the authority is considered void between those points. This track release must begin at the outer limit of the authority.

## 9.16 Stop and Proceed Indication

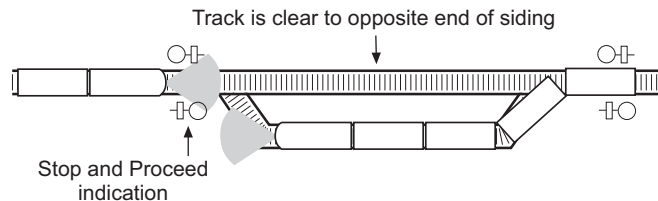
At a signal displaying a Stop and Proceed indication, the train will be governed as follows:

1. The train must stop, then proceed at restricted speed.
- or
2. The train may pass the signal at restricted speed without stopping to do any of the following:
  - a. Leave the main track when the switch is lined for movement and the track is clear from the signal to the clearance point.



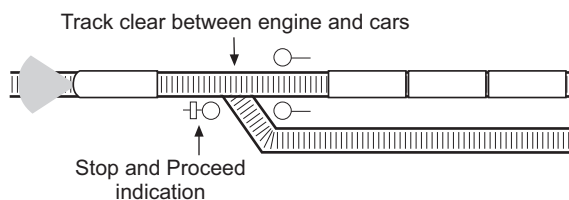
[Diagram A.]

- b. Continue on the main track when meeting or passing a train, and the main track is clear to the opposite end of the siding where a train is fouling the main track.



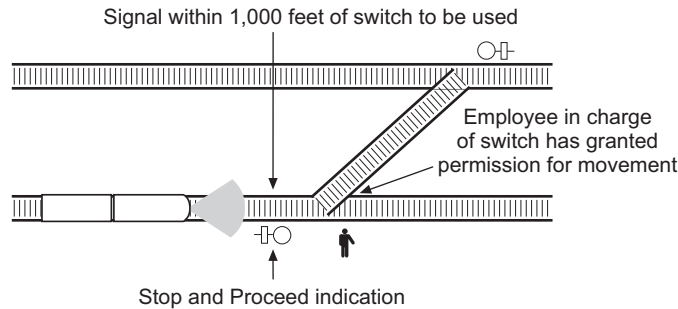
[Diagram B.]

- c. Permit an engine, with or without cars, to couple to its train or to a standing cut of cars, if the track between the engine and cars is clear.



[Diagram C.]

- d. Enter a switch that is less than 1,000 feet beyond the signal, and the employee in charge of the switch has granted permission for movement.

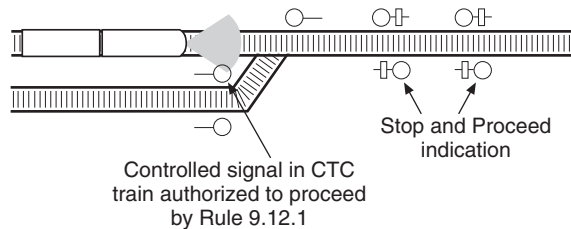


[Diagram D.]

- e. ~~Continue on the main track when proceeding at restricted speed due to rule or previous signal indication.~~

**BNSF Amendment—Paragraph 2.e. is changed to read:**

- e. Proceed from a Stop indication in CTC territory, when authorized by the control operator as prescribed in Rule 9.12.1 (CTC Territory). This will apply to each consecutive signal displaying a Stop and Proceed indication.



[Diagram E.]

- f. Move within track and time, work and time, work between, track permit, or track out of service limits.

## 9.17 Entering Signaled Track at Hand-Operated or Spring Switch

Within CTC territory and manual interlocking limits, the control operator must authorize the train to enter the track at a hand-operated or spring switch where no governing signal exists. The control operator must verify that there are no conflicting movements before giving the authority.

In ABS territory, when authorized to enter the signaled track, a crew member or switch tender must open the switch and wait 5 minutes at the switch to establish block signal protection. If at the end of 5 minutes the employee does not hear or see movement approaching, the train may enter the signaled track. At a crossover, line the switch in the track the train is on, wait the 5 minutes, then line the other switch of the crossover.

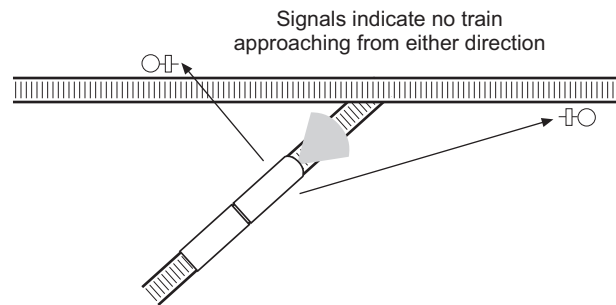
### A. When Hand Operation of a Spring Switch or 5-Minute Wait is Not Required

Waiting 5 minutes or operating the spring switch by hand is not required [unless prescribed by Rule 8.9 (Movement over Spring Switches)] under any of the following conditions:

1. Switch is equipped with an electric lock.
2. Track occupancy indicator indicates track is clear.

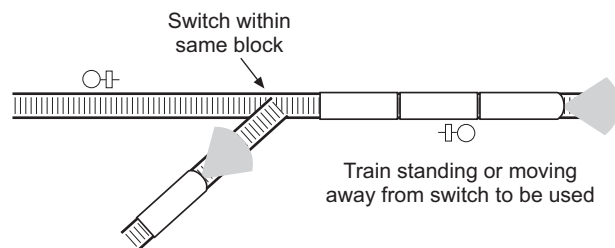


3. Block signal governing movement to signaled track indicates proceed.
4. Block signals governing movements on the signaled track indicate that no train is approaching from either direction.



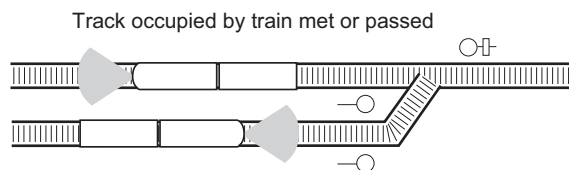
[Diagram A.]

5. Block to be entered is occupied by a train, engine, or car that is standing or moving away from the switch to be used.



[Diagram B.]

6. Main track between siding switches is occupied by a train that has been met or a standing train that will be passed.



[Diagram C.]

7. Train is entering a main track outside of yard limits for authorized movement against the current of traffic.
8. Rule 6.14 (Restricted Limits) is in effect, provided movement does not occur beyond restricted limits for 5 minutes after the main track circuit is fouled, unless a block signal displays a proceed indication.
9. Work and time authority is granted within DTC.
10. Track permit authorizes movement.
- or
11. Track warrant outside yard limits authorizes "WORK BETWEEN" two specific points.

### 9.17.1 Signal Protection in ABS by Lining Switch

When a train or engine is within ABS limits and requires action as necessary to stop other trains, this may be provided by lining and locking a main track switch against movement at or beyond the point where the train or engine will stop movement or clear the main track.

If the switch is located within a block other than the one occupied, do not make movements until 5 minutes after the switch has been lined. Also, make sure no train or engine is between the switch and the train or engine being protected or is within or closely approaching the block where the switch is located.

Except where Rule 6.13 (Yard Limits) or Rule 6.14 (Restricted Limits) is in effect, a train must receive permission from the train dispatcher before crossing over to or obstructing another main track signaled for movement in one or both directions.

Train dispatcher must ensure that no other movements against the current of traffic have been or will be authorized. Crew members must notify the train dispatcher when their movement is clear of the other main track.

In addition, before crossing over or fouling a main track, trains must comply with the following:

- a. Do not move until 5 minutes after lining the switch.
- b. Locate the block signal that protects the switch against trains moving with the current of traffic. To move against the current of traffic past that signal, pull the leading engine or car 100 feet beyond the signal. Wait 10 minutes before moving any further against the current of traffic. Then proceed at restricted speed.
- c. To move against the current of traffic beyond any further signals, obtain authority as outlined in Rule 14.6 (Movement Against the Current of Traffic) or Rule 15.3 (Authorizing Movement Against the Current of Traffic).

## 9.18 Electrically Locked Switches and Derails

Special instructions or instructions posted near the switch will govern the operation of switches and derails equipped with electric locks.

To enter a track within manual interlocking or CTC limits, employees must not open the case door or unlock an electrically locked switch or derail without track and time or authority from the control operator.

### Emergency Release

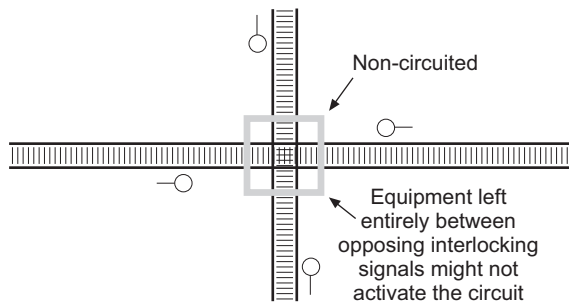
If the electric lock includes an emergency release, do not break the seal on the release or operate the release without permission from the control operator or train dispatcher. However, when communication has failed, the seal may be broken and/or the release operated:

- To permit a train to leave the main track.
- or
- To permit a train that has authority to enter the main track. Train must not enter the main track until 5 minutes after the seal is broken and/or the release operated.

Notify the control operator or train dispatcher when the seal has been broken and/or the emergency release operated.

## 9.19 Leaving Equipment in Signal Systems

Engines, cars, or equipment must not be detached and left standing entirely between the opposing interlocking signals that govern movements at a railroad crossing at grade.



[Diagram A.]

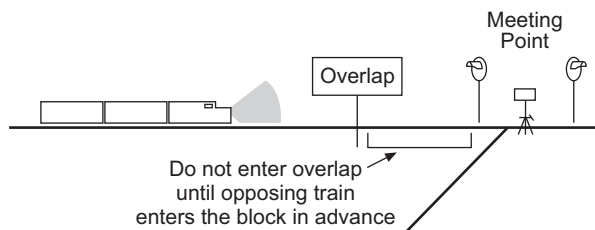
Do not depend upon track equipment, other than engines or cars to actuate block signals, interlocking signals, or highway crossing signals or to be under the protection of such signals.

## 9.20 Clear Track Circuits

A train, engine, car, or equipment left standing on sidings or other tracks must be clear of insulated joints at clearance points.

## 9.21 Overlap Circuits

Overlaps may be identified by overlap signs. A train on the main track at a meeting point must not pass an overlap sign location or open a switch within the overlap until the opposing train has entered the block.



[Diagram A.]

A preceding train must clear the overlap as soon as possible to avoid delaying a following train.

Unless otherwise instructed by the train dispatcher, a train on a siding at a meeting or passing point must not pass an overlap sign location until authorized to leave the siding.

## 9.22 Standing on Sanded Rail

Do not allow an engine with less than three cars, or cuts of four cars or less, to stand on a sanded rail.

## 9.23 Suspension of Block System

When authorized, a track bulletin may suspend the block system or sections of it.

Do not suspend the block system or sections of it until all trains and control operators in the affected territory have been notified by track bulletin specifying the limits of the suspension.

Track bulletins issued to suspend the block system must not be delivered to trains entering the affected territory until the affected limits are clear of trains, or until the track bulletin has been transmitted or delivered to all trains within the limits.

### 9.23.1 Guidelines While Block System is Suspended

When the block system or sections of it are suspended, the following guidelines govern:

- Employees must follow rules that apply to non-signaled territory.
- Trains must receive a track bulletin prescribing speed restrictions that do not exceed 59 MPH for passenger trains or 49 MPH for other trains.
- Trains will disregard extinguished or illuminated block and interlocking signals except where:
  - Signals govern movements over railroad crossings at grade or drawbridges.
  - or
  - Signals are connected with trackside warning detectors.

Trains must approach the block and interlocking signals excepted above and each end of the suspended limits prepared to stop. Trains that leave the limits and move into block system territory must move at restricted speed until they reach the first signal in service beyond the limits. Signals that govern movement over railroad crossings at grade and drawbridges must be regarded as displaying a Stop indication, regardless of the aspect displayed, unless the track bulletin specifies that the signals are in service.

If the crew does not know that signals governing movement over railroad crossings at grade are in service, the crew must provide flag protection in each direction on conflicting routes before proceeding over the crossing. Crew members must not rely on time release or key controller operation as adequate protection while moving over the crossing, unless they are instructed otherwise.

- On multiple main tracks, a track bulletin will designate the track or tracks the block system is suspended on. A track bulletin that specifies the track to be used will be issued to each train.
- Where automatic crossing warning devices have been affected, action to be taken will be stated in the track bulletin.
- Dual control switches on the main track will be lined and locked for main track movement. Switches equipped with selector levers will be locked in the HAND position. All other dual control switches will be spiked. All concerned will be notified. Until informed by the train dispatcher, trains must stop and inspect dual control switches, foul the circuit, and make sure the switch is properly lined before passing over it.

A track bulletin must be issued that specifies which position dual control switches at the end of double track or multiple main tracks are to be left lined.

If a crew member receives notification from the train dispatcher of the position of dual control switches, leave those switches in that position after use.

- Spring switches that will be removed from service must be spiked and those concerned notified.

If spring switches are left in service, trains making facing point movements must be prepared to stop, unless it is known that the switch is properly lined.

- When the block system has been returned to normal operation, a track bulletin must notify all trains within the affected territory before any train can enter the limits and be governed by the block system.

## 9.24 Call Lights

When a call light is on, any employee who sees it, unless the employee is on a moving train, must contact the control operator immediately.

## 10.0 Rules Applicable Only in Centralized Traffic Control (CTC)

### 10.1 Authority to Enter CTC Limits

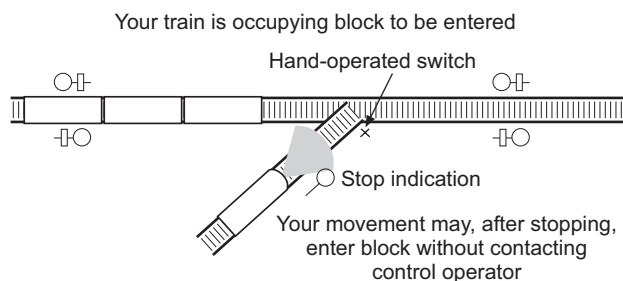
CTC limits are designated in the timetable. Sidings within CTC limits are controlled sidings and are governed by CTC rules. A train must not enter or occupy any track where CTC is in effect unless a controlled signal displays a proceed indication or the control operator authorizes:

- Movement past a Stop indication under Rule 9.12.1 (CTC Territory).
  - A train to enter track between block signals as follows: “(Train) at (location) has authority to enter (track) and proceed (direction).” After entering the track, the train is authorized to move only in the direction specified.
- or
- Track and Time under Rule 10.3 (Track and Time).

#### Signal Governing Movement Over a Hand-Operated Switch

If a signal governs movement over a hand-operated switch that is not electrically locked, the control operator must authorize the train to enter or occupy any track where CTC is in effect before the switch is opened. After the switch is opened, if the signal does not display a proceed indication, a crew member must wait 5 minutes at the switch. After the 5 minute wait if the signal does not display a proceed indication, move the train at restricted speed and notify the control operator.

However, if the block to be entered is occupied by its own standing train or when the hand-operated switch remains open, the movement may, after stopping, pass an absolute signal displaying a Stop indication without waiting 5 minutes and without contacting the control operator.



[Diagram A.]

**BNSF Amendment—The following rule is added:**

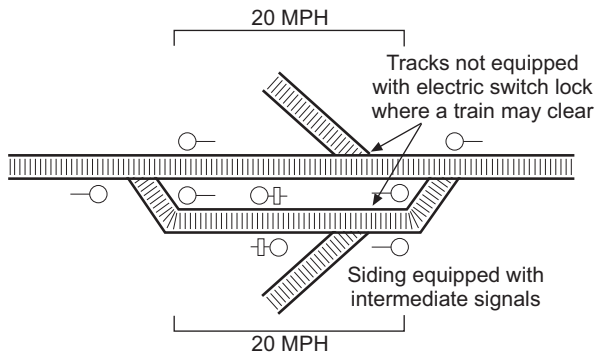
#### 10.1.1 Leaving the Main Track

Unless authorized by track and time, a crew member must notify the control operator when the train clears the main track unless a crew member is in position to prevent a following movement from passing.

### 10.2 Clearing Through Hand-Operated Switches

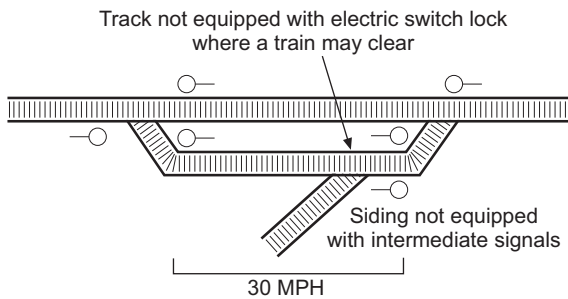
Where CTC is in effect, a train must not clear in any track at a hand-operated switch not equipped with an electric switch lock, except under one of the following conditions:

- Where the permanent maximum authorized speed does not exceed 20 MPH on the main track or controlled siding.



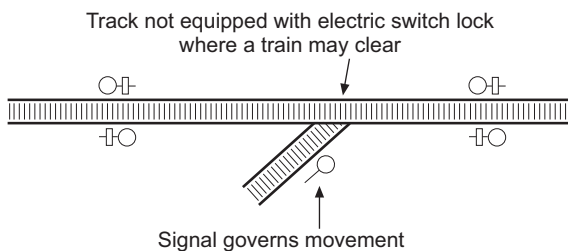
[Diagram A.]

- Where the permanent maximum authorized speed does not exceed 30 MPH on a controlled siding not equipped with an intermediate signal.



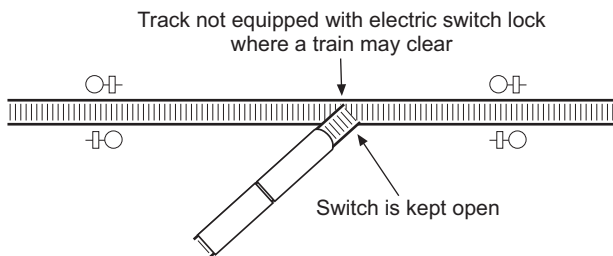
[Diagram B.]

- Where a signal governs movement to a track where CTC is in effect.



[Diagram C.]

- When the hand-operated switch is kept open.

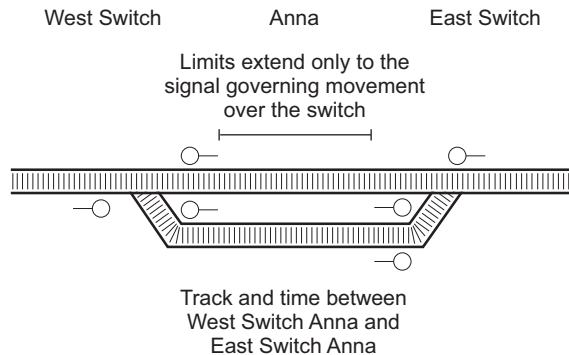


[Diagram D.]

### 10.3 Track and Time

The control operator may authorize a train to occupy a track or tracks within specified limits for a certain time period. Authority must include track designation, track limits, and either a time limit or the words “until released”. The train may use the track in either direction within the specified limits according to signal indication until the limits are verbally released.

Limits designated by a switch extend only to the signal governing movement over the switch unless otherwise designated.



[Diagram A.]

**Track and time does not authorize trains to occupy the track(s) within interlocking limits.**

**BNSF Amendment—The instructions inside the box are changed to read:**

Track and time does not authorize trains to occupy the main track within automatic interlocking limits.

#### A. Passing Signal Displaying Stop or Stop and Proceed Indication

Except at interlockings, trains granted track and time:

1. After stopping at a signal displaying a Stop indication, must be granted verbal authority to enter the limits at either end. Verbal authority is not required after stopping within the limits or when entering the limits at any other location. Train must move at restricted speed.
2. Must observe the requirements for inspection of spring switches.
3. May pass a signal within the limits displaying Stop and Proceed indication without stopping.

#### B. Time Limits

Trains must release track and time before the time granted expires. When necessary to modify the expiration time, an employee and the control operator must communicate before time expires to adjust the time granted. If the employee cannot contact the control operator and the time limit expires, authority is extended until the control operator is contacted.

#### C. Releasing When Within the Limits

If no other employee has received track and time within the same limits, a train may release track and time to move in a specified direction. Signal indications will then govern the train, if the control operator verbally authorizes the release specifying direction of movement.

Employees releasing track and time must state:

- Their name or other identification.
- The track and time limits being released, including number, if applicable.

#### D. Releasing Portion of Limits

When a crew member informs the control operator that the authority is released between two specific points, the authority is considered void between those points. This track release must begin at the outer limit of the authority.

### **10.3.1 Protection of Limits**

Before granting track and time, the control operator must apply blocking or marking devices to the control machine to prevent movement into the limits. The control operator may only grant track and time:

1. If the limits are clear.
2. If the limits are occupied by a train with track and time or that will receive track and time.
3. For an engine to switch a train standing within the limits. Crew members on the engine must provide protection against possible movement of the standing train, if necessary.  
or
4. After all trains moving within the limits that do not have track and time have passed the location where the track will be occupied and the employee has been notified that authority is granted behind such trains.

Blocking or marking devices must not be changed or removed until limits have been released to the control operator.

### **10.3.2 Protection of Machines, Track Cars, or Employees**

Machines, track cars, or employees will receive track and time in the same manner as trains.

Machines, track cars, or employees must be clear of the limits before the employee granted track and time releases the authority.

### **10.3.3 Joint Track and Time**

Before track and time is granted where limits will be jointly occupied, the control operator must issue joint track and time to all trains, machines, track cars, or employees within the same limits or that will enter the limits. Trains must move at restricted speed within joint track and time limits.

### **10.3.4 Track and Time Acknowledgment**

Track and time authority must be recorded and repeated to the control operator. Acknowledgment must be received before being acted upon.

The control operator must maintain a record of the authority granted.



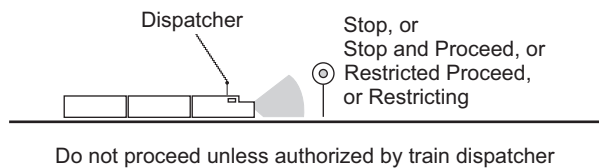
## 11.0 Rules Applicable in ACS, ATC and ATS Territories

### 11.1 Establishing Absolute Block

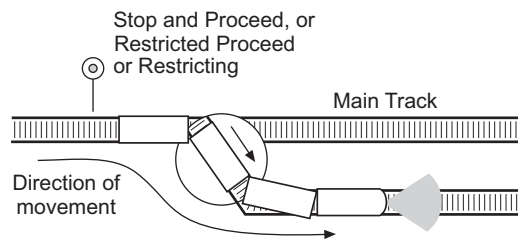
Absolute block may be established in advance of a train. The train dispatcher can establish it verbally or by issuing a track bulletin addressed only to the train affected by stating, "Absolute block is established in advance of your train between \_\_\_\_\_ and \_\_\_\_\_."

### 11.2 Signal Indications with Absolute Block

When absolute block is established in advance of a train, the train must not pass a signal indicating Stop, Stop and Proceed, Restricted Proceed, or Restricting unless verbally authorized by the train dispatcher. However, the train may leave the main track through a switch that is immediately after a signal indicating Stop and Proceed, Restricted Proceed or Restricting.

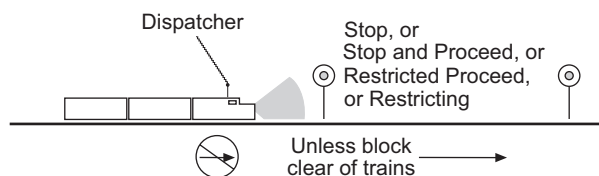


[Diagram A.]



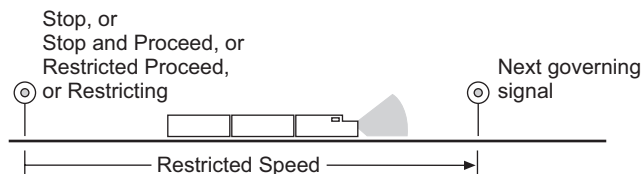
[Diagram B.]

When absolute block is established in advance of a train, the train dispatcher must not authorize the train to pass a signal indicating Stop, Stop and Proceed, Restricted Proceed, or Restricting until the block governed by that signal is clear of trains.



[Diagram C.]

If authorized to pass the signal, the train must proceed at restricted speed until it reaches the next governing signal.



[Diagram D.]

### 11.3 Broken or Missing Seals

Do not break the seal on the cutout cock or cut out ACS or ATS devices unless they do not operate properly. Report ACS or ATS failures, interruptions, and removal of or missing seals to the train dispatcher immediately.

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## **12.0 Rules Applicable Only in Automatic Train Stop System (ATS) Territory**

### **12.1 Required Equipment**

Except as provided in Rule 12.2 (ATS Device Cut Out, Not Equipped, or Not Working), an engine controlling the air brakes of a passenger train within ATS limits must be equipped with an operative ATS device.

#### **12.1.1 ATS Seals and Keys**

When operating in ATS territory, the ATS must be sealed or locked.

### **12.2 ATS Device Cut Out, Not Equipped, or Not Working**

Within ATS limits, if the ATS device on an engine controlling the train's air brakes fails or is cut out enroute, or if the engine on a train being detoured is not equipped with a working ATS device, the following will apply:

- The train dispatcher must be notified promptly by radio or telephone.
- The train may proceed according to signal indication, but cannot exceed 40 MPH until an absolute block is established in advance of the train.
- If an absolute block is established in advance of the train as provided in Rule 11.1 (Establishing Absolute Block), the train may proceed according to signal indication, but cannot exceed 79 MPH.

### **12.3 Unusual Conditions**

#### **12.3.1 ATS Penalty Brake Application**

When two successive ATS penalty brake applications have occurred while passing over inductors at signals displaying Proceed, engineer must acknowledge at each succeeding inductor thereafter, regardless of signal indications and report to the train dispatcher.

#### **12.3.2 ATS Inoperative**

The ATS system is considered inoperative when:

- Acknowledging at subsequent inductors at signals when required by Rule 12.3.1 (ATS Penalty Brake Applications), or at two successive inert inductors, does not prevent penalty stops.
  - The acknowledgment alarm fails to sound or light fails to illuminate when acknowledgment is required at an inductor at a wayside signal indicating other than Proceed.
  - Brakes do not apply upon failure to acknowledge a signal indicating other than Proceed.
- or
- Absence of, or damage to, an ATS receiver is noted.

#### **12.3.3 Damaged Inductor**

Employees noting the absence of or damage to a wayside inductor in approach to a signal must notify the train dispatcher. The train dispatcher must immediately call the signal maintainer who must cause the signal to display its most restrictive indication until inductor is replaced or repaired.

## **12.4 ATS Testing**

### **12.4.1 Test Inductor Locations**

1. Move engine at 3 MPH or more over first inductor while holding the acknowledging device in full position (not over 15 seconds) to determine that brake application does not occur.
2. Move engine at 3 MPH or more over second inductor and do not acknowledge. A brake application should occur. Operate reset device to full position and release brakes.
3. Report as prescribed in Rule 17.4.1.

### **12.4.2 No Test Inductors**

At locations where there are no test inductors:

1. Pass a test bar under the ATS receiver while holding the acknowledging device in full position (not over 15 seconds) to determine that brake application does not occur.
2. Pass a test bar under the ATS receiver and do not acknowledge device. A brake application should occur. Operate reset device to full position and release brakes.
3. Report as prescribed in Rule 17.4.1.

## 13.0 Rules Applicable Only in Automatic Cab Signal System (ACS) Territory

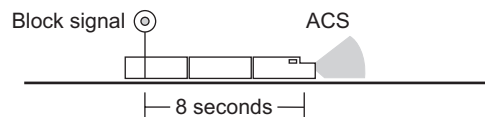
### 13.1 General Information

#### 13.1.1 Observance of Signals

The Automatic Cab Signal (ACS) system is used in addition to block signals to govern the use of blocks. However, employees must continue to observe rules that govern the use of block signals as well as other rules, except as outlined in Rules 13.2.1 (Restrictive to More Favorable) and 13.2.2 (Favorable to More Restrictive).

#### 13.1.2 Conforming with Block Signals

The cab signal and block signal systems are interconnected so that the cab signal agrees with the block signal indication within 8 seconds after the engine passes the block signal that governs entrance into a block.



[Diagram A.]

#### Exception

The ACS system is to be considered inoperative through turnouts and crossovers. Block signal indications and speeds specified in the special instructions for each turnout govern movements through turnouts and crossovers.

#### 13.1.3 Does Not Indicate Conditions Ahead

Cab signals will not indicate conditions ahead when the engine is:

- Moving against the current of traffic.
- Shoving cars.
- or
- Moving backward and not equipped for backward operation.

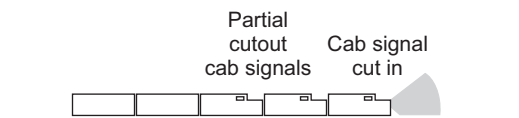
### 13.1.4 Cab Signals Cut In and Out

The cab signal on the lead unit must be cut in before entering and while operating within ACS territory and placed in partial cutout after leaving ACS territory.



[Diagram A.]

The cab signal must be placed in partial cutout on all trailing units in ACS territory.



[Diagram B.]

**BNSF Amendment—The last sentence is deleted from the last paragraph:**

Before taking charge of an engine in or approaching ACS territory, the engineer must know that the cab signal devices are cut in and operative and that the ACS cutout is properly sealed. If the device was cutout or seal is missing upon taking charge of a locomotive, the ACS equipment must be re-tested. If device was previously tested and fails to function properly upon entering, or while operating in ACS territory, the train dispatcher must be notified and the train must be operated under an absolute block. ~~If the device was not tested previously, the engineer must make a departure test prior to entering ACS territory.~~

**Do not cut out cab signal devices while the train is in ACS territory, unless authorized to do so.**

**BNSF Amendment—The following note is added:**

Note: Partial cutout requirements do not apply to engines not so equipped.

## 13.2 Normal Operation

### 13.2.1 Restrictive to More Favorable

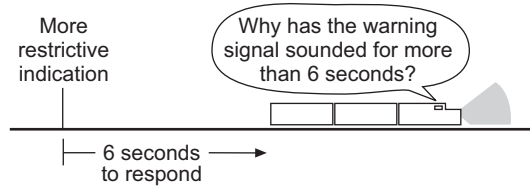
Cab signal indications do not supersede the indication displayed on block and interlocking signals. However, when a cab signal changes to a more favorable indication after having passed the block or interlocking signal, the train may immediately comply with the indication.

### 13.2.2 Favorable to More Restrictive

When a cab signal changes to a more restrictive indication, the engineer must comply promptly with the indication received.

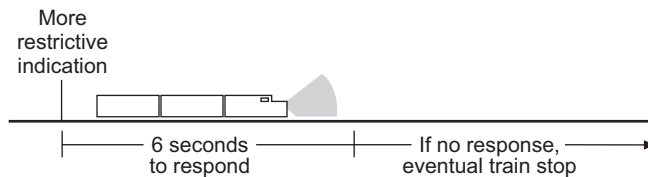
#### Acknowledging Restrictive Indication

When a cab signal changes to a more restrictive indication, the engineer must acknowledge the change with the acknowledging device. On engines not equipped with the Coded Cab Signal-Safety Control (CCS-SC) System, another member of the crew must immediately find out from the engineer why the warning whistle sounded longer than 6 seconds. When conditions require, the crew member must stop the train immediately.



[Diagram A.]

On engines equipped with CCS-SC, the engineer must acknowledge the change within 6 seconds of receiving it to avoid a penalty brake application.



[Diagram B.]

#### Penalty Brake Application Occurs

On engines equipped with CCS-SC, if the engineer does not acknowledge the more restrictive indication, a full service penalty brake application will occur automatically within 6 to 8 seconds. When this occurs, the engineer must do the following:

- Place the automatic brake valve handle in suppression position and leave it there until the train stops.
- Place the throttle in idle position.
- Acknowledge the signal change with the acknowledging device.
- After the train has stopped and the P.C. light goes out, place the automatic brake valve handle in release position.

### 13.2.3 Elimination of Audible Indicator

To keep the audible indicator from sounding while the train is stopped in a cab signal test loop, place the reverser handle in either the neutral or reverse position. This will change the cab signal to its most restrictive aspect. After acknowledging the signal change, no more signal changes will be received.

Place the reverser handle in the forward position to automatically restore the equipment to normal operation.

Since the reverser handle in trailing units is in neutral position, the audible indicator is automatically silenced on trailing units.

## 13.3 Unusual Conditions

### 13.3.1 Cab Signal and Block Signal Do Not Agree

If the cab signal does not display the proper ACS aspect shown in the Block and Interlocking Signal Rules:

- The most restrictive block or cab signal indication must be complied with. A crew member must promptly notify the train dispatcher of the location, signal number, and track where the signals did not agree.
- At control point locations with only an absolute signal(s), when authorized by the train dispatcher to pass the Stop indication, the cab signal may change to a more favorable indication at the signal. The train may comply with the cab signal indication. This is normal due to track circuitry and would not be considered an improper display of the cab signal.

**BNSF Amendment—Delete the following exception:**

**Exception**

~~When the train dispatcher's instructions require the train to proceed at Restricted Speed, the train must comply with the train dispatcher's instructions regardless of cab signal indication.~~

### 13.3.2 Inoperative Cab Signal Device

The ACS system is to be considered inoperative when:

- The audible indicator does not sound when the cab signal changes to a more restrictive indication.
  - The audible indicator continues to sound when the cab signal change is acknowledged.
  - The cab signal does not conform at two consecutive block or interlocking signal locations.
- or
- Any part of the cab signal device is damaged.

**Known in Advance**

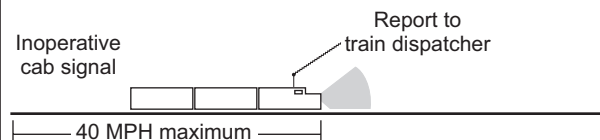
When it is known in advance that the ACS system is inoperative in a specific area, crew members will be notified with a track bulletin.

### 13.3.3 Movement with an Inoperative Cab Signal Device

**BNSF Amendment—Entire rule is changed to read:**

When it is determined the cab signal device is inoperative, the train may proceed according to block signal indications. However, the train must not exceed 40 MPH until it reaches a point where a crew member can report the defect to the train dispatcher.

The train dispatcher will establish an absolute block in advance of the train.



[Diagram A.]



## 14.0 Rules Applicable Only Within Track Warrant Control (TWC) Limits

<b>TRACK WARRANT</b> (Suggested Form)	
NO:	
TO:	
1. <input type="checkbox"/> TRACK WARRANT NO. _____ IS VOID. 2. <input type="checkbox"/> PROCEED FROM _____ TO _____ ON _____ TRACK. 3. <input type="checkbox"/> PROCEED FROM _____ TO _____ ON _____ TRACK. 4. <input type="checkbox"/> WORK BETWEEN _____ AND _____ ON _____ TRACK. 5. <input type="checkbox"/> NOT IN EFFECT UNTIL _____. 6. <input type="checkbox"/> THIS AUTHORITY EXPIRES AT _____. 7. <input type="checkbox"/> NOT IN EFFECT UNTIL AFTER ARRIVAL OF _____ AT _____. 8. <input type="checkbox"/> HOLD MAIN TRACK AT LAST NAMED POINT. 9. <input type="checkbox"/> DO NOT FOUL LIMITS AHEAD OF _____. 10. <input type="checkbox"/> CLEAR MAIN TRACK AT LAST NAMED POINT. 11. <input type="checkbox"/> BETWEEN _____ AND _____ MAKE ALL MOVEMENTS AT RESTRICTED SPEED. LIMITS OCCUPIED BY TRAIN. 12. <input type="checkbox"/> BETWEEN _____ AND _____ MAKE ALL MOVEMENTS AT RESTRICTED SPEED. LIMITS OCCUPIED BY MEN OR EQUIPMENT. 13. <input type="checkbox"/> DO NOT EXCEED _____ MPH BETWEEN _____ AND _____. 14. <input type="checkbox"/> DO NOT EXCEED _____ MPH BETWEEN _____ AND _____. 15. <input type="checkbox"/> FLAG PROTECTION NOT REQUIRED AGAINST FOLLOWING TRAINS ON THE SAME TRACK. 16. <input type="checkbox"/> TRACK BULLETINS IN EFFECT _____, _____, _____, _____. 17. <input type="checkbox"/> OTHER SPECIFIC INSTRUCTIONS: _____ _____ _____ _____	OK _____ (TIME) DISPATCHER _____  LIMITS REPORTED CLEAR AT _____ (Mark the box for each item instructed.)

[Diagram A.]

### 14.1 Authority to Enter TWC Limits

Where designated by the timetable, a track warrant will authorize main track use under the direction of the train dispatcher or as prescribed by Rule 6.13 (Yard Limits) or Rule 6.14 (Restricted Limits). Track warrant instructions must be followed where yard limits or restricted limits are in effect.

## 14.2 Designated Limits

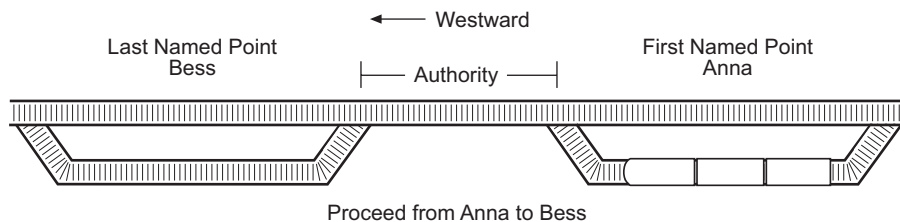
Track warrant limits must be designated by specifying track, where required, and specific locations such as switches, mile posts, or railroad identifiable points. However, station names may be used as follows:

### A. First Named Point

When a station name designates the first named point, authority extends from and includes the last siding switch. Authority extends from the station sign if no siding exists.

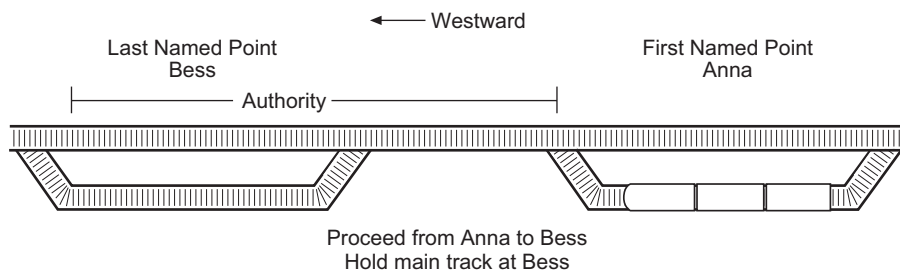
### B. Last Named Point

When a station name designates the last named point, authority extends to and includes the first siding switch. Authority extends to the station sign if no siding exists.



[Diagram A.]

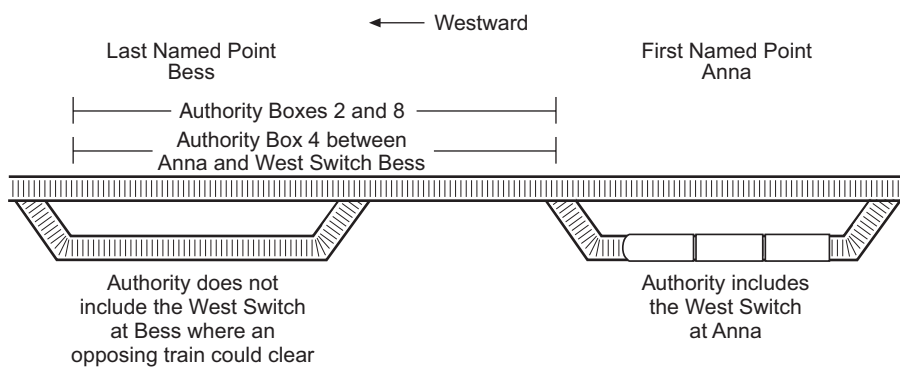
At the last named point, authority extends to but does not include the last siding switch when the track warrant states, "Hold main track at last named point."



[Diagram B.]

## 14.3 Operating with Track Warrants

A track warrant authorizes a train or engine to occupy the main track within designated limits. However, the train or engine must not foul a switch at either end of the limits where an opposing train may use the same switch to clear the main track.



[Diagram A.]

The train or engine must move as follows:

1. Proceed from one point to another in the direction the track warrant specifies. When a crew member informs the train dispatcher that the entire train has passed a specific point, track warrant authority is considered void up to that point.

**BNSF Amendment—The following is added to Item 1:**

Record the location of the specific point on the track warrant form.

or

2. If authorized to “WORK BETWEEN” two specific points, the train or engine may move in either direction between those points. When a crew member informs the train dispatcher that the authority is released between two specific points, the authority is considered void between those points. This track release must begin at the outer limit of the authority.

**BNSF Amendment—The following is added to Item 2:**

Record the location of the specific points on the track warrant form.

### 14.3.1 Leaving the Main Track

A train authorized to proceed in one direction must inform the train dispatcher when it leaves the main track before reaching the last named point, unless a crew member is left to prevent a following movement from passing.

## 14.4 Occupying Same Track Warrant Limits

A track warrant must not be issued to a train within the same or overlapping limits with another train unless:

1. In signaled territory, all trains are authorized to proceed in the same direction.
2. In non-signaled territory, all trains are authorized to proceed in the same direction and are instructed to move at restricted speed.
3. Two or more trains are authorized to “WORK BETWEEN” two specific points at restricted speed within the overlapping limits.
4. Trains are authorized to proceed through the limits of another train authorized to “WORK BETWEEN” two specific points, and track warrants instruct all trains to move at restricted speed within the overlapping limits. When station name(s) designate the overlapping limits, refer to Rule 14.2 (Designated Limits) for limits where trains are required to move at restricted speed.

or

5. Radio Blocking is authorized as outlined by Rule 14.4.1 (Radio Blocking).

Where track warrant authority includes yard limits or restricted limits, the terms of Rule 6.13 (Yard Limits) or Rule 6.14 (Restricted Limits) apply, but track warrant instructions must be followed.

### 14.4.1 Radio Blocking

Where designated by special instructions, in non-signaled territory, more than one train may be authorized to proceed in the same direction within the same or overlapping limits, provided the following train:

- Is notified on the track authority of the identity of the preceding train.
- Does not occupy the limits ahead of the preceding train.
- Notifies the crew of the preceding train that radio blocking has been authorized stating the limits.
- Is notified by the preceding train that the entire train has passed a specific location. Location specified must not be beyond limits indicated. The following words must be used: “(Train) clear of (location)”.
- Does not proceed beyond the last location the preceding train has reported to have passed.

All instructions between the trains must be written, repeated, and acknowledged with “THAT IS CORRECT” before being acted on. These written instructions between the trains must be retained until the end of tour of duty.

Notify the train dispatcher if communication cannot be established between the two trains. If necessary, radio blocking information may be relayed only by the train dispatcher.

The last named point of the following train’s authority must not extend beyond the last named point of the preceding train’s authority.

In the application of Rule 6.4 (Reverse Movements) and Rule 6.6 (Picking Up Crew Member), the movement must not go beyond the last specific location reported to the following train.

Written Instructions Between Trains			
(Suggested Form)			
(Following Train ID) is authorized Radio Blocking from _____ to _____ behind (Preceding Train ID).			
	<b><u>LOCATION</u></b>	<b><u>TIME</u></b>	<b><u>CREW MEMBER</u></b>
(Preceding Train ID) clear of	_____ at _____		reported by _____
	_____ at _____		reported by _____
	_____ at _____		reported by _____
	_____ at _____		reported by _____
	_____ at _____		reported by _____

## 14.5 Protecting Men or Equipment

Men or equipment may receive a track warrant in the same manner as trains to occupy or perform maintenance on the main track without other protection.

A track warrant must not be issued to protect men or equipment within the same or overlapping limits with a train unless:

1. All trains are authorized to proceed in one direction only, and the track warrant specifies that men or equipment do not occupy limits ahead of these trains.
- or
2. All trains authorized are notified of the men or equipment and have been instructed by track warrants to move at restricted speed within overlapping limits. When station name(s) designate the overlapping limits, refer to Rule 14.2 (Designated Limits) for limits where trains are required to move at restricted speed. Also, a track warrant must inform the employee in charge of men or equipment about the trains. If the track is not safe for trains to move at restricted speed, the employee must protect the track with red flags according to Rule 5.4.7 (Display of Red Flag or Red Light).

## 14.6 Movement Against the Current of Traffic

When a track warrant authorizes a train to move against the current of traffic, the train must use only the track designated within the specified limits. This train must not allow a train following on the same track to pass, unless the train dispatcher instructs it to pass.

## 14.7 Reporting Clear of Limits

A train without a crew member on the rear and operating in non-signaled or double track territory may report clear of the limits, report having passed a specific location, or release the track between two specific locations only when it is known the train is complete. This must be determined by one of the following ways:

1. The rear of the train has a rear-end telemetry device, and air pressure on the head-end device indicates brake pipe continuity.
2. An employee verifies the marker is on the rear of the train.
3. A crew member can observe the rear car of the train on which the marker is placed.
4. The train is stopped, and an inspection verifies that the marker is on the rear car of the train.
5. A trackside warning detector transmits an axle count for the train, and the axle count duplicates the axle count transmitted by the previous trackside warning detector.

In addition, a train clearing in a siding or other track must comply with requirements outlined in Rule 8.3 (Main Track Switches) before reporting clear of the limits.

### **BNSF Amendment—Delete the following paragraph:**

~~When a hand-operated switch is used to clear the main track, except where Rule 6.13 (Yard Limits) or Rule 6.14 (Restricted Limits) are in effect, advise the train dispatcher of the position of the switch and that the switch is locked when reporting clear of track warrant limits. Train dispatcher shall repeat the reported switch position and employee releasing the limits shall confirm to the train dispatcher this information is correct.~~

## 14.8 Track Warrant Requests

An employee who requests a track warrant must inform the train dispatcher what movements will be made and, when necessary, which tracks will be used and how much time is required.

## 14.9 Copying Track Warrants

The conductor and the engineer must each have a copy of the track warrant issued to their train, and each crew member must read and understand it. The copy must show the date. The following must occur when transmitted verbally:

### ~~A. Transmitting Track Warrants~~

- ~~1. An employee will enter all of the information and instructions on the track warrant.~~
- ~~2. The employee will repeat the preprinted and written information transmitted by the train dispatcher.~~
- ~~3. The train dispatcher will check it and, if correct, will say "OK" and give the time and his initials.~~
- ~~4. The employee will enter the "OK" time and the train dispatcher's initials on the track warrant and repeat them to the train dispatcher.~~

### **BNSF Amendment—Item A is changed to read:**

#### **A. Transmitting Track Warrants**

1. The train dispatcher will transmit the track warrant, followed by a summary of the total number of boxes and individual box numbers included by stating:  
“(total number) boxes marked:  
(Individual box numbers).”
2. An employee will enter all of the information transmitted by the train dispatcher, except the summary. As the summary is transmitted, the employee will check the total number of boxes and individual box numbers copied to ensure all items are included.
3. The employee will repeat the preprinted and written information transmitted by the train dispatcher, followed by a summary of the total number of boxes and individual box numbers included by stating:  
“(total number) boxes marked:  
(Individual box numbers).”
4. The train dispatcher will check the repeat and, if all information including the summary is correct, will state the following:

“Authority (number) OK (time) (dispatcher initials).”

The employee will enter the OK time and the train dispatcher's initials on the track warrant and repeat them to the train dispatcher,

or

If the track warrant includes after arrival, the dispatcher will state the following:

“Authority (Number) with after arrival of (train) at (location) OK (time) (dispatcher initials).”

The employee will enter the OK time and the train dispatchers initials on the track warrant and repeat the “After Arrival” information, OK time and dispatcher's initials to the train dispatcher.

Note: The summary information in Items 1, 2, 3 and the after arrival information in Item 4 will be exempt from pronouncing and spelling numbers as indicated in GCOR 2.14.1, Verbally Transmitting and Repeating Mandatory Directives.

**B. In Effect**

1. The track warrant is not in effect until the “OK” time is shown on it.
2. If the track warrant restricts movement or previously granted authority, it cannot be considered in effect by the train dispatcher until acknowledgment of the “OK” has been received.

~~Employees may relay track warrants.~~

**BNSF Amendment—The last sentence is changed to read:**

Rules qualified employees may relay track warrants.

**14.9.1 Duplicating Track Warrants**

Employees who reproduce track warrants with a duplicating machine do not need to repeat them to the train dispatcher.

Duplicated track warrants must not be delivered or used until they are checked and verified as:

- Legible.
- Duplicated in their entirety.

**14.10 Track Warrant in Effect****BNSF Amendment—Entire rule is changed to read:**

A track warrant is in effect until a crew member reports the train has cleared the limits, or the track warrant is made void. The crew member must inform the train dispatcher when the train has cleared the limits. Before a train reports clear of a track warrant, the track warrant is made void or a portion of track warrant limits are released, a crew member must restore hand operated main track switches to normal position unless relieved by track warrant.

Employees reporting clear of track warrant limits must state:

- Their name or other identification
- Track warrant number being released
- Limits being released

In non-signaled territory or double track ABS territory (outside of restricted limits or yard limits), a crew member will job brief with the train dispatcher about the position of main track switches and those switches operated are locked within the limits being released, referencing completion of the Position of Switch form or stating no entries required.

**Time Limit Shown**

If the track warrant shows a time limit, the train must clear the limits by the time specified, unless another track warrant is obtained. If an employee cannot contact the train dispatcher and the time limit expires, authority is extended until the train dispatcher is contacted.

### **14.11 Changing Track Warrants**

Employees must not add to or alter the track warrant in any manner, except as specified by Rule 15.1.1 (Changing Address of Track Warrants or Track Bulletins).

When the limits or instructions of a track warrant must be changed, a new track warrant must be issued showing, "Track Warrant No. \_\_\_\_\_ is void" and the number of the track warrant being changed. When a track warrant of a previous date is voided, the date must be included. The previous track warrant will no longer be in effect.

### **14.12 Not Used**

### **14.13 Mechanical Transmission of Track Warrants**

Repetition is not required when track warrants are transmitted mechanically. The "OK" time will be given when the track warrant is issued.

Track warrants that restrict the authority or movement of a train must not be transmitted mechanically, unless the train being restricted will not leave the point without receiving the track warrant.



## 15.0 Track Bulletin Rules

(Suggested Form) Track Bulletin Form A								
No. _____		On _____		SUBDIV. _____				
To _____								
Between points shown in lines 1 through 10 below, do not exceed speed given: (Use last two columns when displayed less than distance prescribed by Rule 5.4.2 to indicate location and direction.)								
Line Void	Line No.	Between/At Location & Location		Speed MPH PSGR      FRT		Track(s)	Flags At MP	For Direction
	1.							
	2.							
	3.							
	4.							
	5.							
	6.							
	7.							
	8.							
	9.							
	10.							
		11. Other Conditions _____						
		OK _____ Dispatcher _____						

[Diagram A.]

(Suggested Form) Track Bulletin Form B									
No. _____		On _____		SUBDIV. _____					
To _____									
On (Date) _____		Be governed by Rules 15.2 and 15.2.1 within the following limits: (Use last two columns when displayed less than distance prescribed by 5.4.3 to indicate location and direction.)							
Line Void	Line No.	Between Location & Location		From	Until	Track(s)	Foreman and/or Gang No.	Y/R Flag At MP	For Direction
	1.								
	2.								
	3.								
	4.								
	5.								
	6.								
	7.								
	8.								
	9.								
	10.								
		OK _____ Dispatcher _____							

[Diagram B.]

## 15.1 Track Bulletins

Track bulletins must not be changed unless specified by Rules 15.1.1 (Changing Address of Track Warrants or Track Bulletins) or Rule 15.13 (Voiding Track Bulletins). The train dispatcher will issue track bulletins as required. Track bulletins will contain information on all conditions that affect safe train or engine movement. Forms other than track bulletin Forms A and B may be used when necessary.

### Receipt and Comparison of Track Bulletins

The conductor and engineer must receive a track warrant at their initial station unless otherwise instructed by the train dispatcher. All track bulletins that affect their train's movement must be listed on the track warrant, unless the track warrant shows "NONE" or "NO." The conductor and engineer must have copies of all track bulletins listed and other instructions required. Each crew member must read and understand them.

All crew members are responsible for complying with the requirements of track bulletins and reminding each other of those requirements.

At the initial station, when outbound crew members receive track warrants and track bulletins from inbound crew members, the conductor and engineer must compare the track warrants and track bulletins with each other and with the train dispatcher before proceeding.

At locations where track warrants listing track bulletins are received by printer or fax, crew members must verify that route description, if printed, covers the intended route of their train. If it does not, contact the train dispatcher and determine if the track warrant is valid. Also, crew members must check the date and "OK" time on the track warrant and if the track warrant is over 4 hours old, contact the train dispatcher and determine if additional track bulletins are needed.

Any rule referencing track warrants is also applicable to DTC authority.

### 15.1.1 Changing Address of Track Warrants or Track Bulletins

If the address must be changed on a track warrant used to deliver track bulletins only or a track bulletin that does not grant authority according to Rule 15.3 (Authorizing Movement Against the Current of Traffic), the train dispatcher may verbally change the train symbol, engine identification, direction, or date.

## 15.2 Protection by Track Bulletin Form B

Display track flags as specified in Rule 5.4.3 (Display of Yellow-Red Flag) and Rule 5.4.7 (Display of Red Flag or Red Light).

A train must not enter the limits unless instructed by the employee in charge. A train within the limits at the time the track bulletin Form B takes effect must not make further movement until instructed by the employee in charge.

A crew member must attempt to contact the employee in charge of a track bulletin Form B to avoid delay, giving the train's location and track being used. The employee in charge will use the following format to establish communication with the train:

Foreman (name and/or gang number) using Track Bulletin No. \_\_\_\_ (specifying line number when necessary) between MP \_\_\_\_ and MP \_\_\_\_ (specifying subdivision when necessary).

Trains within the limits of a track bulletin Form B, unless otherwise restricted, must move at the speed(s) specified by the employee in charge as stated in Item A (Instructions).

### A. Instructions

After communication with the train has been established, the employee in charge will use the following format to grant a train permission to proceed through the Form B limits:

- (Train ID) may pass the red flag (or red light) at MP \_\_\_\_ (without stopping) and proceed at (one of the following), (specifying track when necessary):
  - "Maximum Authorized Speed"
  - "Restricted Speed"
  - A speed specified by the employee in charge

Two additional speeds may be given to restrict a train's movement through a portion of the limits, by adding the following:

- Do not exceed \_\_\_\_MPH between/at MP \_\_\_\_ and MP \_\_\_\_ (or other location).

To require a train to stop at a designated location within the limits, add the following:

- Stop at MP \_\_\_\_ (or other location) until additional instructions are received.

When men or equipment foul adjacent track(s), add the following:

- Men or equipment fouling (specify track).

## **B. Repeat Instructions**

A crew member must repeat the above instructions, and the employee giving the instructions must acknowledge them before they can be followed.

Once instructions are received from employee in charge, if the track route changes from previous instructions received, contact employee in charge to determine that original instructions received are valid on new track route before proceeding on the new route. The movement must not change direction without permission from the employee in charge.

**BNSF Amendment—The following rule is added:**

### **C. Stop Column**

When "STOP" is written in the Stop column, the train must not enter the limits unless instructed by the employee in charge. A red flag or red light may be displayed at the beginning of the limits. A train within the limits at the time the track bulletin Form B takes effect, must not make further movement until instructed by the employee in charge.

**BNSF Amendment—The following rule is added:**

### **D. Entering Within Limits**

Before entering the track governed by the track bulletin Form B from any location other than the beginning of the Form B limits, obtain permission from the employee in charge.

## **15.2.1 Protection for On-Track Equipment**

Track bulletin Form B may be used to protect on-track equipment, such as rail detector cars, without using yellow-red flags. Identify protected equipment in the track bulletin.

While trains, engines, and protected equipment are in track bulletin limits, they will otherwise be governed by Rule 15.2 (Protection by Track Bulletin Form B). The same track bulletin must not protect other gangs and equipment.

## **15.3 Authorizing Movement Against the Current of Traffic**

Where Rule 9.14 (Movement with the Current of Traffic) is in effect, a track bulletin may authorize movement against the current of traffic as follows:

1. "(Train) will use \_\_\_\_ track against the current of traffic (point) to (point)."

The train must use only the track specified between these points. Opposing trains must not leave the last point until the train arrives. The train dispatcher must not authorize a following train to move against the current of traffic until the previous train has cleared the last point.

The example may be modified as follows:

- a. “After (opposing train) arrives at (point), (train) will use \_\_\_\_\_ track against the current of traffic (point) to (point).”

The train that will move against the current of traffic must not leave the first point until the opposing train arrives.

Trains directly affected in both directions must receive this track bulletin and must not:

- Clear the main track.
- Allow a following train to pass.
- or
- Pass a preceding train, unless authorized by the train dispatcher.

2. “(Time) until (time) (date), all trains use \_\_\_\_\_ track between (point) and (point). All trains must stop before fouling \_\_\_\_\_ track between these points unless directed to proceed by employee in charge of switches or by train dispatcher.”

This bulletin may also contain information on public crossing protection, switches spiked, intermediate flagman, and so forth.

**Following Movement.** A train may not follow another train against the current of traffic until the previous train has cleared the limits, passed a designated location, or passed a flagman located at the next intermediate point. Flag protection is not required against following trains.

**Flagman Provided.** When flagmen are provided, the example will be modified by adding:

- “Intermediate flagman located at (point). Trains moving against the current of traffic must stop short of flagman unless directed to proceed.”

**Extending Time.** Time may be extended by issuing another track bulletin as follows:

- “Track bulletin No. \_\_\_\_\_ is extended until (time).”

This bulletin will be used when one or more tracks will be removed from service, and all trains in both directions must use the remaining track as directed by the train dispatcher or an employee in charge of switches at each end of the designated limits.

The train dispatcher will authorize movement between the designated points and issue the track bulletin and necessary instructions to the employee in charge of switches. This employee may verbally direct movement or use hand signals. Also, the train dispatcher may use a controlled signal indication to authorize movement.

All affected trains must receive a copy of the track bulletin.

## 15.4 Protection When Tracks Removed from Service

Before a track is removed from service it must be protected.

A track bulletin may protect tracks removed from service by designating the track and naming the points at each end of the track. Trains must not use this track, unless the track bulletin states the name or title of an employee who may authorize use, and this person directs all movement. Movements must be made at restricted speed.

Proper authority must also be received to pass an absolute signal displaying a Stop indication to enter the out of service track. Except at interlockings, after stopping, movements may pass Stop indications within the out of service limits. Movements within the out of service limits may pass Stop and Proceed indications without stopping.

When required, the train dispatcher must advise crews of alternate routes and switch positions.

## 15.5 Protection When Tracks Blocked with Equipment

Notify the train dispatcher when main tracks, sidings, or other tracks that are normally clear are blocked with equipment and cannot be cleared.

When the main track is blocked, provide protection as specified by Rule 6.20 (Equipment Left on Main Track).

## **15.6 Change of a General Order, Special Instruction, or Rule**

When authorized by the designated manager, a track bulletin may be used to issue, change, or cancel general orders, special instructions, or rules.

General orders or special instructions canceled by track bulletins must not be reinstated. The track bulletin must remain in effect until the general order that contains the change is posted.

## **15.7 Copying Track Bulletins**

The conductor and the engineer must each have a copy of the track bulletins issued to their train, and each crew member must read and understand them. The copy must show the date. The following must occur when track bulletins are transmitted verbally:

1. An employee will enter all of the information on the track bulletin.
2. The employee will repeat the information to the train dispatcher.
3. The train dispatcher will check it and, if correct, will say “OK” and give the time and his initials.
4. The employee will enter the “OK” time and the train dispatcher’s initials on the track bulletin and repeat them to the train dispatcher.

Employees may relay track bulletins.

## **15.8 Duplicating Track Bulletins**

Employees who reproduce track bulletins with a duplicating machine do not need to repeat them to the train dispatcher.

Duplicated track bulletins must not be delivered or used until they are checked and verified as:

- Legible.
- Duplicated in their entirety.

## **15.9 Mechanical Transmission of Track Bulletins**

Repetition is not required when track bulletins are transmitted mechanically. The “OK” time will be given when the track bulletin is issued.

## **15.10 Retaining Track Bulletins**

Employees must keep and comply with track bulletins on all trips during the tour of duty when track bulletins were received.

When directed by the train dispatcher, track bulletins may be retained for use during the next tour of duty. Before initiating movement on the main track on the next tour of duty, a crew member must verify from the train dispatcher that no additional track bulletins are needed.

## **15.11 Not Used**

## 15.12 Relief of Engineer or Conductor During Trip

When a conductor, engineer, or both are relieved before a trip is finished, they must contact the train dispatcher and comply with instructions concerning the handling of their track warrants, track bulletins, and other instructions.

When crew members are called to relieve a train at other than the initial station, crew members must contact the train dispatcher before leaving the initial station and determine if any track warrants, track bulletins, or other instructions must be obtained.

### Comparison of Information

The relieving conductor and engineer must compare track warrants, track bulletins, instructions, and pertinent information with each other and with the train dispatcher before proceeding.

## 15.13 Voiding Track Bulletins

To void a numbered line on a track bulletin, a part of a track bulletin, or an entire track bulletin, the train dispatcher may do one of the following:

### A. Voiding Track Bulletins Verbally

Void the track bulletin by verbally using one of the following examples:

1. "Line (number) of track bulletin No. \_\_\_\_ reading (quote the line to be voided) is void."
2. "That part of track bulletin No. \_\_\_\_ reading (quote the part to be voided) is void."
3. "Track bulletin No. \_\_\_\_ is void."

Employee must repeat the information to the train dispatcher. If correct, the word "VOID" will be entered to indicate that portion is no longer in effect.

### B. Issue Track Bulletin or a Track Warrant to Void a Track Bulletin

Issue a track bulletin or use the line designated "OTHER SPECIFIC INSTRUCTIONS" on a track warrant using one of the following examples:

1. "Line (number) of track bulletin No. \_\_\_\_ is void."
2. "That part of track bulletin No. \_\_\_\_ reading (quote the part to be voided) is void."
3. "Track bulletin No. \_\_\_\_ is void."

Where paper copies are used, employee will keep a copy of the track warrant or track bulletin that made it void and the word "VOID" will be entered to indicate that portion is no longer in effect.

The track bulletin or the part of the track bulletin indicated will no longer be in effect.

### BNSF Amendment—The following rule is added:

#### 15.13.1 Voiding General Track Bulletins or Restrictions

To void a bulletin restriction or an entire general track bulletin, train dispatcher may do the following:

1. "Restriction (number) \_\_\_\_ reading \_\_\_\_ is void."

An employee must repeat this information to the train dispatcher. If the information is correct, the employee must write "Void" in the margin to the left of the restriction made void.

2. "General track bulletin No. \_\_\_\_ is void."

An employee must repeat this information to the train dispatcher. If the information is correct, the employee must write "Void" across the first page of the general track bulletin being voided.

## 15.14 Delivering Track Bulletins

Employees who copy track bulletins for delivery must deliver copies to all those addressed, unless the track bulletin is voided or transferred to a relieving employee. When employees have delivered copies to all addressed, they must keep a copy on file.

## 16.0 Rules Applicable Only in Direct Traffic Control (DTC) Limits

### 16.1 Authority to Enter DTC Limits

The timetable will designate DTC limits. A train may enter DTC limits only after receiving authority from the train dispatcher. Men or equipment may be issued DTC authority in the same manner as trains. DTC territory will not include territory where Rule 6.13 (Yard Limits) or Rule 6.14 (Restricted Limits) is in effect.

#### 16.1.1 Switches Between DTC Blocks

Switches between DTC blocks may be occupied only when authority includes at least one block on each side of the switch; however, men or equipment may be authorized to occupy a switch located between DTC blocks without authority on each side of the switch when the DTC authority includes the name of the switch and the instructions "Switch Yes." DTC authority must not be released until the rear of the movement has completely entered the adjoining block.

### 16.2 DTC Authority

The train dispatcher will issue DTC authority to a crew member on the head end of the train when possible. An employee operating the controls of a moving engine or on-track equipment may not copy DTC authority.

#### A. Recorded in Writing

When transmitted verbally, the employee who receives or releases DTC authority must record it in writing and include the following:

1. Name of first and last DTC block where authority is issued.
2. Time that work and time expires.
3. Train identity when DTC authority is issued behind a train or radio blocking behind a preceding train is in effect.
4. Time DTC authority is released to the train dispatcher.

DTC authority must not be transferred to a relieving crew, unless authorized to do so by the train dispatcher.

When verbal authority is received from the train dispatcher to leave equipment in a DTC block, the train dispatcher may instruct a crew member to void the DTC authority.

<p><b>Employees cannot act upon DTC authority until the train dispatcher says, "That is correct."</b></p>
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**B. Multiple Authorities**

Not more than one DTC authority may be issued in the same DTC block except:

1. In ABS territory, as provided by Rule 16.3 (Movement in a Specified Direction), authority may be issued to more than one train in the same direction.
  2. As provided by Rule 16.4 (Work and Time).
- or
3. Where radio blocking is designated by special instructions, in non-sigaled territory, more than one train may be authorized to proceed in the same direction within the same or overlapping limits, provided the following train:
    - Is notified on DTC authority of the identity of the preceding train.
    - Notifies the crew of the preceding train that radio blocking has been authorized stating the limits.
    - Does not occupy the block limits ahead of the preceding train.
    - Is notified by the preceding train that the entire train has cleared a specific block. Location specified must not be beyond block limits of the following train. The following words must be used: “(Train) clear of (block).”
    - Does not proceed beyond the last block the preceding train has reported to have cleared.

All instructions between trains must be written, repeated, and acknowledged with “That is correct” before being acted on. These written instructions between the trains must be retained until the end of tour of duty.

**Written Instructions Between Trains:**

“(Preceding Train ID) has cleared (Block) at (Time).” When all available lines on DTC form have been filled in, new DTC authority must be obtained.

Notify the train dispatcher if communication cannot be established between the two trains. If necessary, radio blocking information may be relayed only by the train dispatcher.

The last named point of the following train’s authority must not extend beyond the authority of the preceding train.

In the application of Rule 6.4 (Reverse Movements) and Rule 6.6 (Picking Up Crew Member), the movement must not enter the last block reported cleared to the following train.

**16.3 Movement in a Specified Direction****Issue Format**

**One or Two Blocks.** The train dispatcher will issue authority and an employee will acknowledge it using the following sample format:

**Train Dispatcher:** “RR 4321 East, with Engineer Jones, you are authorized to proceed Eastward in one block, Anna.”

**Crew Member:** “RR 4321 East, with Engineer Jones, I am authorized to proceed Eastward in one block, Anna.”

**Train Dispatcher:** “RR 4321 East, that is correct.”

**More than Two Blocks.** The train dispatcher will issue authority in more than two blocks using the following sample format:

**Train Dispatcher:** “RR 4321 East, with Engineer Jones, you are authorized to proceed Eastward in three blocks, Anna through Cloy.”



### 16.3.1 Leaving the Main Track

A train authorized to proceed in one direction must inform the train dispatcher when it leaves the main track before reaching the last named point, unless a crew member is left to prevent a following movement from passing.

## 16.4 Work and Time

### A. Issue Requirements

1. Work and time authority may be issued to an employee in charge of on-track equipment when:
  - The DTC block is clear.
  - The DTC block is occupied by a train and/or employee in charge of on-track equipment that has already been issued work and time. Before joint work and time may be issued, the train dispatcher must first notify the engineer of train or employee in charge of on-track equipment affected that the DTC block will be jointly occupied. All movements must be made at restricted speed within joint work and time limits.or
  - All trains issued Rule 16.3 (Movement in a Specified Direction) have passed the location where the track will be occupied, and the employee receiving the DTC authority is notified that work and time is granted behind such trains.
2. Work and time authority may be issued to a train when:
  - The DTC block is clear.
  - The DTC block is occupied by a train and/or employee in charge of on-track equipment that has already been issued work and time. Before joint work and time may be issued, the train dispatcher must first notify the engineer of train or employee in charge of on-track equipment affected that the DTC block will be jointly occupied. All movements must be made at restricted speed within joint work and time limits.or
  - All trains issued Rule 16.3 (Movement in a Specified Direction) have passed the location where the track will be occupied and the employee receiving the DTC authority must be notified that work and time is granted behind such trains as prescribed by Rule 16.2 (DTC Authority).

A train or on-track equipment issued work and time may occupy the designated block and move in either direction.

An employee in charge of on-track equipment granted work and time behind a train must not pass train(s) specified.

### B. Issue Format

**One or Two Blocks.** The train dispatcher will issue work and time and an employee will acknowledge it using the following sample format:

<b>Train Dispatcher:</b>	"RR 4321 East, with Engineer Jones, I am granting you work and time in one block, Anna, until 10:10 AM."
<b>Crew Member:</b>	"RR 4321 East, with Engineer Jones, I am granted work and time in one block, Anna, until 10:10 AM."
<b>Train Dispatcher:</b>	"RR 4321 East, that is correct."

**More than Two Blocks.** The train dispatcher will issue authority in more than two blocks using the following sample format:

**Train Dispatcher:** “RR 4321 East, with Engineer Jones, I am granting you work and time in 3 blocks, Anna through Cloy, until 10:10 AM.”

**Crew Member:** “RR 4321 East, with Engineer Jones, I am granted work and time in three blocks, Anna through Cloy, until 10:10 AM.”

Unless the train and/or employee in charge of on-track equipment receives a time extension, they must clear the block and report “Released” before the time limit expires. The train dispatcher may issue an unspecified time limit by using the words “until released.”

**A train dispatcher must not authorize a train to enter a DTC block under Rule 16.3 (Movement in a Specified Direction) until work and time in that block is released.**

### C. Additional Time

Trains or the employee in charge of on-track equipment must release work and time before the time granted expires. If the train or employee in charge requires additional time, the authority must be obtained from the train dispatcher before time expires. If a train crew member or employee in charge is unable to contact the train dispatcher, and the time limit expires, authority is extended until the train dispatcher is contacted.

## 16.5 Changing DTC Authority

When it becomes necessary to change the authority previously granted to a train, a new authority will be issued in accordance with Rule 16.3 (Movement in a Specified Direction) or Rule 16.4 (Work and Time). After the “(\_\_\_\_\_), that is correct” response is received from the train dispatcher, the authority previously granted becomes void.

The train dispatcher must notify the engineer before withdrawing previously issued DTC authority.

## 16.6 Releasing DTC Authority

Unless the train dispatcher specifies otherwise, when a train with directional authority clears a DTC block, an employee will immediately release it to the train dispatcher. The train must not re-enter the DTC block it has been released from.

Before a DTC block is released, engineer and conductor must communicate with each other and confirm that their train is clear of DTC block(s) to be released.

### A. Release Format

**One or Two Blocks.** An employee will release a DTC block, and the train dispatcher will acknowledge it using the following sample format:

**Crew Member:** “RR 4321 East, with Engineer Jones, I am releasing one block, Anna.”

**Train Dispatcher:** “RR 4321 East, with Engineer Jones, you are releasing one block, Anna.”

**Crew Member:** “Train dispatcher, that is correct.”

**More than Two Blocks.** An employee will release more than two blocks using the following sample format:

**Crew Member:** “RR 4321 East, with Engineer Jones, I am releasing three blocks, Anna through Cloy.”

**A DTC block is not released until the employee releasing the block reports, “Train dispatcher, that is correct.”**

**B. Operating in Non-Signaled or Double Track Territory**

In non-signaled or double track territory, a train without a crew member on the rear of the train may release a DTC block only when the complete train is clear of the limits, which is determined by one of the following:

1. The rear of the train has an operating rear-end telemetry device, and the air pressure on the head-end device indicates brake pipe continuity.
2. An employee verifies that a marker is on the rear of the train.
3. A crew member can observe the rear car of the train on which the marker has been placed.
4. A trackside warning detector transmits an axle count for the train, and the axle count duplicates the axle count transmitted by the previous trackside warning detector.

In addition, a train clearing in a siding or other track must comply with requirements outlined in Rule 8.3 (Main Track Switches) before reporting clear of the limits.

**16.7 Communication Failure**

If communication fails, a third party may relay the authority to enter and/or release a DTC block as follows:

- The train dispatcher must transmit the DTC authority to the third party.
- The third party must repeat it back to the train dispatcher.
- If correct, the train dispatcher will respond, “(Third Party Identification), that is correct for relay,” which authorizes the third party to transmit the DTC authority to a crew member.
- The crew member receiving the DTC authority must repeat it back to the third party.
- If correct, the third party will respond, “(\_\_\_\_\_), that is correct” and inform the train dispatcher that DTC authority has been relayed correctly.

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## 17.0 Rules Applicable Only in Automatic Train Control (ATC) Territory

### 17.1 Automatic Train Control Territory

ATC territory is specified in special instructions. An engine must not be operated in ATC territory if it is not equipped with an operable ATC system unless otherwise authorized by special instructions or the train dispatcher.

### 17.2 Taking Charge

When taking charge of an engine equipped with ATC in ATC territory or entering such territory, engineers must know that:

1. The ATC system is cut in and sealed or locked on engines equipped.
2. The following devices are sealed (on engines equipped) with a mechanical seal:
  - Speed indicator case.
  - Speed indicator cables.
  - High speed whistle cutout cock.

### 17.3 Cut In and Cut Out Requirements

The ATC system, in part or in its entirety, must not be cut out in ATC territory unless:

- Train dispatcher grants permission.
- or
- Failure of the ATC system prevents train movement at restricted speed (unable to recover the air) and crew is unable to immediately contact the train dispatcher. The train dispatcher must be notified as soon as practical. Notification must include if cab signals are operative.

The train dispatcher may grant permission to a crew member to cut out the ATC system when:

- It has failed. Before granting permission to the crew to cut out the ATC the train dispatcher must determine if the cab signals are operative.
- or
- Required for movements against the current of traffic at speeds above restricted speed.

#### A. Cutting In ATC

To cut in ATC:

1. Turn on the ATC system.
2. Acknowledge when the acknowledging horn sounds.
3. Cut in the ATC actuator and seal or lock.

#### B. Cutting Out ATC

To cut out ATC:

1. Break the seal or unlock and cut out the ATC actuator.
2. Turn off the power to the ATC system.

If ATC is cut out due to failure enroute, at the next stop the engineer must cut in the ATC to determine if it is again operable. Train dispatcher must be notified if ATC is again operative or continues to fail and if cab signals are operative if previously cut out.

## 17.4 Departure Test Requirements

A departure test is required:

- Before entering ATC territory.
- or
- When the ATC is cut in after being cut out enroute within ATC territory.

### A. Energized Test Loop

While the engine is standing on energized test loop:

1. The cab signal should display a Clear aspect.
2. When the test loop is de-energized or when the engine is moved off of the test loop, the aspect will change to a Restricting and the acknowledging horn will sound. Do not acknowledge the horn and do not move the brake valve handle.
3. A penalty brake application should occur within 8 seconds.
4. Recover the air.
5. When the horn sounds again, acknowledge to prevent a penalty brake application.

Note: To recover the air after an ATC penalty brake application, acknowledge the horn or alarm and move the brake valve handle to SUPPRESSION until the PCS light has gone out. The brakes may then be released.

Receivers on Both Ends: When an engine has ATC receivers on both ends and is standing on energized track, the cab signal should display Clear.

1. Place the reverser in Reverse position. The cab signal will change to Restricting and the acknowledging horn will sound.
2. Do not acknowledge the horn and do not move the brake valve handle. A penalty brake application should occur within 8 seconds.
3. Recover the air.
4. When the horn sounds again, acknowledge to prevent brake application.

### B. De-energized Track

When engine is standing on de-energized track:

1. Release the brakes, but do not acknowledge the acknowledging horn.
2. A penalty brake application should occur within 8 seconds.
3. Recover the air.
4. When the horn sounds again, acknowledge to prevent a penalty brake application.

### 17.4.1 Departure Test Reporting

Records of ATC and ATS tests:

- Must be retained for 92 days.
  - Must be placed in the engine cab.
1. When Mechanical Department employees perform the test:
    - One part of the form must be retained at the test location for 92 days.
    - The other must be placed in the inspection holder in the engine cab.
  2. At points where engineers are required to perform ATC or ATS departure tests, engineers must complete the form, place it in the inspection holder of the engine, and notify the train dispatcher. Crew members are not to remove this form unless specifically instructed to do so.
  3. The train dispatcher, unless instructed otherwise, must record the date, time, location, engine number and name of the engineer.

## 17.5 High Speed Setting

When a cab signal displays a Clear aspect and the train speed exceeds the high-speed setting, a high speed whistle will sound continuously. This will require a SUPPRESSION brake application within 6 seconds to prevent a penalty brake application.

### 17.5.1 Over 40 MPH

The high-speed whistle will sound when the speed is more than 40 MPH when the cab signal changes to a Restricting aspect.

1. Move the brake valve handle to SUPPRESSION within 6 seconds to prevent a penalty brake application.
2. When speed is reduced to less than 40 MPH, the high-speed whistle will stop and the acknowledging horn will sound.
3. Acknowledge this horn. If the cab signal continues to display Restricting, speed must immediately be reduced to restricted speed.

If restricted speed is not reached within 70 seconds after the acknowledging horn was acknowledged, a penalty brake application will occur unless the brake valve handle is in SUPPRESSION.

### 17.5.2 Under 40 MPH

The acknowledging horn will sound if the cab signal changes from Clear to Restricting when the speed is under 40 MPH.

1. Acknowledge the horn within 6 seconds to prevent a penalty brake application.
2. If the cab signal continues to display Restricting, train speed must immediately be reduced to restricted speed.

If restricted speed is not reached within 70 seconds after the acknowledging horn was acknowledged, a penalty brake application will occur unless the brake valve handle is in SUPPRESSION.

### 17.5.3 Restricting Cab Signal

When cab signal changes from a Clear to a Restricting aspect, trains exceeding Restricted Speed must immediately reduce to Restricted Speed. While the cab signal continuously displays a Restricting aspect, the acknowledging horn will sound to alert the crew members of the restriction. When the speed is approaching the restricting over speed setting, the low speed alarm will sound to alert crew members that speed must be reduced.

## 17.6 Conforming with Block Signals

Cab signal indications do not supersede the indication displayed on block and interlocking signals. The most restrictive block or cab signal indication must be complied with. However, when the cab signal changes from Restricting to Clear after having passed the block or interlocking signal, the train may immediately comply with the cab signal indication.

Except where cab signals are capable of displaying diverging route aspects, when initiating movement or when the cab signal changes from Restricting to Clear after the engine passes a signal that governs the approach to a diverging route, the train must approach the next signal at the speed prescribed for the most restrictive route at that location until the next signal is visible.

Note: When the cab signal cycles from Clear to Restricting and immediately back to Clear, the train may continue at normal speed.

### 17.6.1 Approaching Diverging Route

When the cab signal changes from Restricting to Clear after the engine passes a signal displaying an Approach or a more restricting indication and the next signal can display an indication for a diverging route, the train must approach the next signal at the speed prescribed for the most restrictive route at that location. However, if the signal is seen to display an indication for a more favorable route, the speed for that route governs.

## 17.7 ATC Failure/Cut Out Enroute

When any part of the ATC system is cut out enroute:

1. Before an absolute block is established in advance of the train:
  - If cab signals are operative or movement will be entirely in continuous block signal territory, proceed not exceeding 40 MPH.
  - or
  - If cab signals are not operative and movement is outside continuous block signal territory, proceed at restricted speed.
2. After an absolute block is established in advance of a train:
  - If cab signals are operative or movement will be entirely in continuous block signal territory, proceed in accordance with signal indications not exceeding 79 MPH.
  - If cab signals are not operative and movement is outside continuous block signal territory:
    - Passenger trains may proceed not exceeding 59 MPH.
    - Freight trains may proceed not exceeding 49 MPH.



3. Before an absolute block in advance of movement is established in ATC territory the train dispatcher must determine if:
  - The cab signals are operative.
  - The absolute block in advance of movement will be entirely in territory with continuous fixed block signals.
    - a. If the cab signals are operative or the absolute block in advance of movement will be entirely in continuous block signal territory, the train dispatcher may establish an absolute block in advance of movement as provided by Rule 11.1 (Establishing an Absolute Block). Rule 11.2 (Signal Indications with Absolute Block) applies. If the cab signal changes to Restricting, the train must stop.
    - b. If the cab signals are inoperative and any part of the absolute block in advance of movement will be outside continuous block signal territory, the train dispatcher must not establish an absolute block in advance of movement until it is determined that no trains or engines:
      - Occupy the limits ahead of the train being given the absolute block in advance of movement.
      - Will occupy the limits ahead of the train being given the absolute block in advance of movement.
    - c. Rule 9.15 (Track Permit) or Rule 10.3 (Track and Time) establishes an absolute block when not issued joint.

#### **17.7.1 Speed Indicator in ATC**

An inoperative or inaccurate speed indicator, as prescribed by Rule 1.39 (Accuracy of Speed Indicator) is considered an ATC failure. Rule 17.7 (ATC Failure/Cut Out Enroute) applies.

#### **17.7.2 ATC Motion Light**

If the motion light is not on when the speed is 6 MPH or above, proceed in accordance with the cab signal indication but not to exceed 40 MPH. Rule 17.7 (ATC Failure/Cut Out Enroute) applies.

#### **17.7.3 Audible Indicator**

If the audible indicator does not sound when the cab signal changes to a more restrictive indication or continues to sound when the cab signal change is acknowledged, it is considered an ATC failure. Rule 17.7 (ATC Failure/Cut Out Enroute) applies.

### **17.8 Improper Display**

If a cab signal displays Clear when it should display Restricting due to an open switch, occupied block, or other condition, the train must:

- Stop and warn other trains by radio of exact location and status of train.
- Contact the train dispatcher and be governed by his instructions. If the train dispatcher gives permission to proceed, the train must proceed at restricted speed until the train dispatcher establishes an absolute block in advance of movement.

**18.0 Section Reserved**

**19.0 Section Reserved**

**BNSF Amendment—The following chapter is added:**

## **20.0 Occupancy Control System (OCS)**

### **20.1 OCS for Trains and Engines**

In addition to GCOR Rule 6.13 (Yard Limits), the following also applies at locations designated under the individual subdivision special instructions:

#### **Occupying the Main Track**

Before occupying the main track, trains or engines must receive one of the following permissions from the train dispatcher.

- Written OCS,
- Proceed indication on a controlled signal,
- or
- Verbal permission.

Individual subdivision special instructions or general order will designate locations where permission is granted by:

- Controlled Signal Indication. (Movements against the current of traffic may be authorized by controlled signal indication.)
- Verbal Permission. (Movements against the current of traffic may be authorized by verbal permission.)

Written OCS must be used when permission is joint with Maintenance of Way.

OCS does not relieve a train or engine from complying with restricted speed in non-signaled territory.

The employee requesting OCS will state name, occupation, location and train or other identification. The employee will repeat the permission granted. Written OCS must be copied on the prescribed form. If the permission is repeated correctly, the train dispatcher will acknowledge. The train must not move until the engineer understands the OCS granted. Written OCS record must be retained until OCS is released.

Employees must advise the train dispatcher when they are clear of the limits. Exception: Trains or engines clearing OCS limits at a control point are not required to report clear.

Employees releasing OCS must state the following:

- Their name.
- The OCS number being released, if applicable.
- The track limits being released.
- The time OCS limits released.

### **Designated Limits**

OCS limits must be designated by specifying track, where required, and exact points such as switches, mile posts, or other identifiable points.

### **Direction of Movement**

When trains or engines receive permission to proceed from one point to another, they must move only in the direction specified.

When trains or engines receive permission to work between two specific points, they may move in either direction between those points.

### **Same Limits with a Train or Engine**

Before a train or engine receives permission to occupy the same limits with a train or engine working between two locations, a crew member of each train or engine must be notified. When notified, all movements must be made at restricted speed.

### **Same Limits with Men or Equipment**

Before a train or engine receives permission to occupy the same limits with men or equipment, the maintenance of way employee in charge and a crew member of the train or engine must be notified. When notified, all movements must be made at restricted speed.

### **Permission Expired**

When unable to contact the train dispatcher and OCS permission expires, permission is extended until the train dispatcher can be contacted.

# Abbreviations

Use only the following abbreviations:

**BNSF amended or added abbreviations are enclosed in a box.**

ABS ..... Automatic Block Signal System  
ACS ..... Automatic Cab Signal System  
AMTK ..... Amtrak

AS ..... Absolute Signal

ATC ..... Automatic Train Control  
ATS ..... Automatic Train Stop  
AUTH ..... Authority  
BO ..... Bad Order  
BRN ..... Branch  
BRT ..... Block Register Territory  
C ..... Center  
C & E ..... Conductor and Engineer

CNT ..... Connection

COFC ..... Container on Flat Car  
CONDR ..... Conductor  
CP ..... Control Point  
CTC ..... Centralized Traffic Control  
DCS ..... Dual Control Switch  
DISPR ..... Dispatcher  
DIST ..... District  
DIV ..... Division  
DT ..... Double Track  
DTC ..... Direct Traffic Control  
E ..... East

EBCS ..... Eastbound Controlled Signal  
EE ..... East End

ENG ..... Engine  
ENGR ..... Engineer  
ESS ..... East Siding Switch  
EWD ..... Eastward

EXO ..... East Crossover

FRT ..... Freight  
HER ..... Head End Restriction  
IM ..... Intermodal  
JCT ..... Junction  
MAX ..... Maximum  
MMT ..... Multiple Main Track  
MP ..... Mile Post  
MPH ..... Miles Per Hour  
MT ..... Main Track  
MW ..... Maintenance of Way  
N ..... North

NA ..... Not Applicable  
NBCS ..... Northbound Controlled Signal  
NE ..... North End

NO ..... Number

NSS ..... North Siding Switch  
NWD ..... Northward

NXO ..... North Crossover

OK ..... Correct  
OOS ..... Out of Service  
OPR ..... Operator  
ORIG ..... Originating  
PSGR ..... Passenger  
RC ..... Radio Channel  
RCO ..... Remote Control Operator  
RCZ ..... Remote Control Zone  
RE ..... Region  
RECD ..... Received

RESTRN ..... Restriction  
RL ..... Restricted Limits  
RP ..... Release Point

S ..... South

SBCS ..... Southbound Controlled Signal

SDG ..... Siding

SE ..... South End  
SS ..... Station Sign

SSS ..... South Siding Switch  
SUB ..... Subdivision  
SUBDIV ..... Subdivision  
SUPT ..... Superintendent  
SW ..... Switch  
SWD ..... Southward

SW-N ..... Switch No  
SW-Y ..... Switch Yes  
SXO ..... South Crossover  
TFND ..... Track Flags Not Displayed

TOFC ..... Trailer on Flat Car  
TRK ..... Track  
TRN ..... Train  
TWC ..... Track Warrant Control  
W ..... West

WBCS ..... Westbound Controlled Signal  
WE ..... West End

WSS ..... West Siding Switch  
WWD ..... Westward

WXO ..... West Crossover

XO ..... Crossover  
YD ..... Yard  
YL ..... Yard Limits  
YM ..... Yardmaster

Use the normal abbreviations for names of months.

# Glossary

## ABS

See Automatic Block Signal System.

## Absolute Block

A length of track that no train is permitted to enter while the track is occupied by another train.

## Absolute Signal

A block or interlocking signal without a number plate, or designated by an A marker.

## ACS

See Automatic Cab Signal System.

## Articulated

Permanently connected multiple unit cars that share a common truck.

## ATC Actuator

An ATC brake applying apparatus.

## ATS

See Automatic Train Stop System.

## Automatic Block Signal System (ABS)

A series of consecutive blocks governed by block signals, cab signals, or both. The signals are activated by a train or by certain conditions that affect the block use.

## Automatic Cab Signal System (ACS)

A system that allows cab signals and the cab warning whistle to operate automatically.

## Automatic Train Control (ATC)

A system to enforce compliance with cab and wayside signal indications. If the train exceeds a predetermined speed for a given signal indication and speed is not reduced at a sufficient rate, brakes are automatically applied.

## Automatic Train Stop System (ATS)

A system activated by wayside inductors positioned to apply the brakes automatically until the train stops.

## Block

A length of track:

- between consecutive block signals.
- between a block signal and the end of block system limits.
- or
- in ATC limits the use of which is governed by cab signals and/or block signals.

## Block Register Territory (BRT)

A method of operation in non-signaled territory where trains, men, and equipment are authorized to occupy the main track in limits designated by the timetable.

## Block Signal

A fixed signal at the entrance of a block that governs trains entering and using that block.

## Block System

A block or series of consecutive blocks within ABS, ACS, CTC, or interlocking limits.

## BRT

See Block Register Territory.

## Cab Signal

A signal in the engineer's compartment or cab that indicates a condition affecting train movement. Cab signals are used with interlocking or block signals or without block signals.

## Cars

Railroad cars.

## Centralized Traffic Control (CTC)

A block system that uses block signal indications to authorize train movements.

## Clearance Point

The location closest to a switch where it is safe for equipment, and a person riding the side of equipment unless prohibited, to pass equipment on an adjacent track.

## Conductor

Employee in charge of train or yard movement.

## Control Operator

Employee assigned to operate a CTC or interlocking control machine or authorized to grant track permits.

## Control Point

The location of absolute signals controlled by a control operator.

## Controlled Siding

A siding within CTC or interlocking limits where a signal indication authorizes the siding's use.

## Controlled Signal

An absolute signal controlled by a control operator.

## Crew Member

Conductors, assistant conductors, brakemen, engineers, remote control operators, yard engine foremen, switchmen, and yard helpers.

## Crossings at Grade

Crossings that intersect at the same level.

## Crossover

A track connection between two adjacent tracks, consisting of two switches, which is intended to be used primarily for the purpose of crossing over from one track to the other.

**CTC**

See Centralized Traffic Control.

**Current of Traffic**

The movement of trains in one direction on a main track, as specified by the rules.

**Direct Traffic Control (DTC)**

A DTC block or a series of DTC blocks where the train dispatcher authorizes track occupancy.

**Distant Signal**

A fixed signal outside a block system that governs the approach to a block signal, interlocking signal, or switch point indicator. A distant signal does not indicate conditions that affect track use between the distant signal and block or interlocking signals or between the distant signal and switch point indicator. A distant signal is identified by a D.

**Double Track**

Two main tracks where the current of traffic on one track is in a specified direction and in the opposite direction on the other.

**Dual Control Switch**

A power-operated switch, moveable point frog, or derail that can also be operated by hand.

**DTC**

See Direct Traffic Control.

**DTC Block**

A length of main track specified by name. DTC block name and limits are identified by wayside signs reading, Begin (name) Block and End (name) Block and by mile post location in the timetable.

**Electric Switch Lock**

An electrically controlled lock that restricts the use of a hand-operated switch or derail.

**Engine**

A unit propelled by any form of energy or more than one of these units operated from a single control. Engines are used in train or yard service. Rules that apply to engines also apply to cab control cars.

**Engineer**

Also includes student engineers, firemen, hostlers, and remote control operators.

**Equipment**

Railroad equipment.

**Equipment Fouling a Track**

The end of rolling equipment or on-track maintenance of way equipment left between the clearance point and the switch points leading to the track on which the equipment is standing.

**Fixed Signal**

A signal that is fixed to a location permanently and that indicates a condition affecting train movement.

**Flagman**

Any employee providing flag protection as outlined in Rule 6.19 (Flag Protection) and for other purposes as outlined in the rules.

**Foreman**

Employee in charge of work.

**BNSF Amendment—Glossary term added:****General Track Bulletin**

A notice containing track bulletin restrictions and other conditions affecting train movement.

**Interlocking**

Signal appliances that are interconnected so that each of their movements follows the other in a proper sequence. Interlockings may be operated manually or automatically.

**Interlocking Limits**

The tracks between outer opposing absolute signals of an interlocking.

**Interlocking Signals**

The fixed signals of an interlocking that govern trains using interlocking limits.

**Main Track**

A track extending through yards and between stations that must not be occupied without authority or protection.

**Men or Equipment**

A term referring to Engineering Department employees and their related equipment.

**Multiple Main Tracks**

Two or more main tracks that are used according to the timetable.

**Pilot**

An employee assigned to a train to assist an engineer or conductor who is unfamiliar with the rules or the portion of railroad the train will operate on.

**Proceed Indication**

Any block signal indication that allows a train to proceed without stopping.

**Radio**

As used in these rules it also applies to wireless communication devices when used in railroad operation.

**Radio Blocking**

A method to establish an absolute block for a following train in non-signaled territory by direct communication with a preceding train.

**RCO**

See Remote Control Operator

**RCZ**

See Remote Control Zone

**Remote Control Operator (RCO)**

An employee who may operate an engine with or without cars by means of a remote control transmitter.

**Remote Control Transmitter**

A device that gives the remote control operator control of a remote control engine.

**Remote Control Zone (RCZ)**

A portion of track(s) within definite limits designated in the timetable special instructions.

**Reverse Movement**

A movement opposite the authorized direction.

**Siding**

A track connected to the main track and used for meeting or passing trains. Location of sidings are shown in the timetable.

**Signal Aspect**

The appearance of a fixed or cab signal.

**Signal Indication**

The action required by the signal aspect.

**Single Track**

A main track where trains are operated in both directions.

**Special Instructions**

Instructions contained in the timetable or other publication.

**Spring Switch**

A switch with a spring mechanism that returns the switch points to the original position after they are trailed through.

**Station**

A place designated by name in the timetable station column.

**Switch Point Indicator**

A light type indicator used during movement over certain switches to show that switch points fit properly.

**Timetable**

A publication with instructions on train, engine, or equipment movement. It also contains other essential information.

**Track Bulletin**

A notice of conditions affecting train movement. It may also authorize movement against the current of traffic where Rule 9.14 (Movement with the Current of Traffic) is in effect.

**Track Occupancy Indicator**

An indicator that tells whether a length of track is occupied or not.

**Trackside Warning Detector**

A device that indicates conditions such as overheated journals, dragging equipment, excess dimensions, shifted loads, high water, or slides.

**Track Warrant Control (TWC)**

A method to authorize train movements or protect men or machines on a main track within specified limits in a territory designated by the timetable.

**Train**

One or more engines coupled, with or without cars, displaying a marker, and authorized to operate on a main track. A term that when used in connection with speed restrictions, flag protection, and the observance of all signals and signal rules also applies to engines.

**Train Coordination**

Working limits established by a roadway worker through the use of a train's authority on a main track or other track where specific authority is required from a control operator or train dispatcher.

**TWC**

See Track Warrant Control.

**Variable Switch**

A switch identified by a V or a bowl painted yellow. When trailed through, the switch points remain lined in the position they were forced.

**Whistle Quiet Zone**

A designated portion of track, that includes road crossing(s) at grade where whistle signal (7) is not regularly sounded.

**Working Limits**

A segment of track within definite boundaries on which movements may be made only as permitted by the employee in charge. Boundaries may be established using mile posts, station signs, timetable locations, or clearly identifiable points.

**Yard**

A system of tracks, other than main tracks and sidings, used for making up trains, storing cars, and other purposes.

**Yard Limits**

A portion of main track designated by yard limit signs and timetable special instructions or a track bulletin.



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**BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT  
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**APPLICATION FOR CERTIFICATION**

***For the CALICO SOLAR (Formerly SES Solar One)***

**Docket No. 08-AFC-13**

**PROOF OF SERVICE  
(Revised 8/9/10)**

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### DECLARATION OF SERVICE

I, Ani Seferyan, declare that on October 25, 2010, I served and filed copies of the attached "Attachment K - Exhibit 1210" dated October 25, 2010. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [\[www.energy.ca.gov/sitingcases/solarone\]](http://www.energy.ca.gov/sitingcases/solarone).

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

*(Check all that Apply)*

#### FOR SERVICE TO ALL OTHER PARTIES:

- ☒ sent electronically to all email addresses on the Proof of Service list;  
☐ by personal delivery;  
☐ by delivering on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses **NOT** marked "email preferred."

**AND**

#### FOR FILING WITH THE ENERGY COMMISSION:

- ☒ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (*preferred method*);

**OR**

- ☐ depositing in the mail an original and 12 paper copies, as follows:

#### **CALIFORNIA ENERGY COMMISSION**

Attn: Docket No. 08-AFC-13  
1516 Ninth Street, MS-4  
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I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

\_\_\_\_\_  
/s/ Ani Seferyan  
Ani Seferyan

# **STATE OF CALIFORNIA**

## **Energy Resources Conservation And Development Commission**

In the Matter of:  
The Application for Certification  
for the Calico Solar Power Project  
Licensing Case

Docket No. 08-AFC-13

### **INTERVENOR BNSF's COMMENTS ON THE PMPD**



## ATTACHMENTS

A	Exhibit 1200
B	Exhibit 1201
C	Exhibit 1202
D	Exhibit 1203
E	Exhibit 1204
F	Exhibit 1205
G	Exhibit 1206
H	Exhibit 1207
I	Exhibit 1208
J	Exhibit 1209
K	Exhibit 1210
L	Exhibit 1211
M	Exhibit 1212
N	Exhibit 1213
O	Exhibit 1214
P	BNSF Post-Hearing Brief
Q	BNSF Comments and Protests to FEIS
R	BNSF Supplemental Comments and Protests to FEIS
S	Sierra Club's PMPD Comments
T	CURE's PMPD Comments

# STATE OF CALIFORNIA

## Energy Resources Conservation And Development Commission

In the Matter of:  
The Application for Certification  
for the Calico Solar Power Project  
Licensing Case

Docket No. 08-AFC-13

**PREPARED DIRECT TESTIMONY OF DOUGLAS HAMILTON,  
P.E., D.WRE  
EXPONENT**

September 17, 2010

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TESTIMONY OF DOUGLAS HAMILTON, P.E., D.WRE

PROPOSED CALICO SOLAR PROJECT, SAN BERNARDINO COUNTY, CALIFORNIA

Q.1 What is your name, occupation, and experience?

A.1 I, Douglas Hamilton, am a registered civil engineer in the State of California (License No. 42210). I am a Principal Engineer at Exponent, Inc. My area of specialization is water resources including flood hazards in arid regions including the sometimes ultra-hazardous processes such as high velocity water flow, uncertain flow paths, erosion, sediment deposition, transport of debris, and perilous impact forces. I have extensive local experience, knowledge of railroad hydrology in Southern California, and international experience in the types of flood hazards associated with alluvial fans. My practice includes identifying and mitigating flood hazards in both the pristine and developed desert regions of California. I have worked with many public and private experts who provide important information that is relevant to this type of hazard including Flood Control agencies in San Bernardino and Riverside Counties. I served on the National

Research Council Committee on *Alluvial Fan Flooding*,<sup>1</sup> and as a consultant to the California Governor's Task Force on Flooding. Later, I served in a key advisory role in the California Governor's Task Force on Alluvial Fan Flooding.<sup>2</sup> My C.V. is attached as Exhibit 1 to this Declaration.

I have direct knowledge of hydrology, geology, geomorphology, sediment transport, and hazardous flooding conditions in the vicinity of the Cady Mountains in San Bernardino County. These types of process affect the Burlington Northern Santa Fe (BNSF) rail line and the proposed Calico Solar Project which is located both north and south of the BNSF line between Daggett and Ludlow in the vicinity of historic Hector, a former watering stop for steam locomotives. This subdivision of the BNSF track was originally built in the 1880's and 1890's. The Hector Station shows up on the United States Geological Survey (USGS) topographic maps that are shown in the background of most of the source maps prepared by the applicant from both

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<sup>1</sup>Alluvial Fan Flooding, National Research Council, National Academy Press, Washington, D.C., 1996 <http://www.nap.edu/openbook.php?isbn=0309055423>

<sup>2</sup>California Governor's Alluvial Fan Task Force, California State University San Bernardino, Water Resources Institute, 2010  
[http://aftf.csusb.edu/documents/FINDINGS\\_Final\\_July2010\\_web.pdf](http://aftf.csusb.edu/documents/FINDINGS_Final_July2010_web.pdf)  
[http://aftf.csusb.edu/documents/IA\\_Final\\_July2010\\_web.pdf](http://aftf.csusb.edu/documents/IA_Final_July2010_web.pdf)  
[http://aftf.csusb.edu/documents/FACT%20SHEET\\_Plenary%2010%20Distribution\\_Mar2010.pdf](http://aftf.csusb.edu/documents/FACT%20SHEET_Plenary%2010%20Distribution_Mar2010.pdf)

the California Energy Commission (CEC)<sup>3</sup> and the United States Bureau of Land Management (BLM)<sup>4</sup>.

Q.2 Are extreme alluvial fan flooding, erosion, and debris flow hazards associated with active alluvial fans at the proposed Calico Solar Site?

A.2 The proposed Calico Solar site is on an active alluvial fan. Significant information exists that confirms the alluvial fans and the associated flooding hazards emanating from the Cady Mountains are located within and pass through the proposed Calico Solar project area. The proposed Calico project area also extends south of the existing BNSF track down to Interstate 40 (I-40) shown on the USGS topographic provided as Exhibit 2 attached to this declaration. The project boundary on Exhibit 2 is the one originally proposed by the applicant.

The Existing Conditions Hydrologic and Hydraulics Study prepared for the applicant by Huitt Zollars on April 23, 2009, Binder 1, Exhibit A shows a Geomorphic Hazard Map for the project area. Basically, this map concludes that virtually the entire area between the foot of the mountains

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<sup>3</sup> <http://www.energy.ca.gov/sitingcases/calicosolar/documents/index.html>

<sup>4</sup> <http://www.blm.gov/ca/st/en/prog/energy/fasttrack/calico.html>

down to the BNSF Railroad is subject to either Severe or High Hazard Levels. Severe and High Hazards mean that high velocity flows, debris flows, unpredictable flow paths, and sediment movement characterize the flood hazards at the site in its existing condition. The applicant and their consultants have not provided an updated map showing that these types of hazards are non-existent in this area. In fact, in 1966, T.W. Dibblee and A.M. Bassett working for the California Division of Mines and Geology, prepared a surficial geology map with cross sections for the area. The map is consistent with the Geomorphic Hazard Map in the Huitt Zollars report and shows that the proposed Calico Solar Site is on an active alluvial fan area composed of Recent Alluvium and Recent Alluvium Fan Gravel (See Exhibit 3). The project boundary shown on Exhibit 3 is the one original proposed by the applicant.

Because the flooding sources emanating from the Cady Mountains flow onto a series of alluvial fans, the direction of flow and the amount of flow in any given desert wash further down the fan is unpredictable. In fact, entirely new desert washes can be formed during a single flood event. This element of randomness is one of the factors that makes flooding on alluvial fans so hazardous.

Appendix G of the FEMA guidelines (See Exhibit 4) for analyzing floods on alluvial fans states that for active alluvial fan areas, the prudent assumption is that all of the water from the apex of the fan could reach any point on the fan and, therefore, the target area where a facility is being designed should accommodate the erosion, sediment, and water from the full flow that emanates from the fan apex.

In a letter dated September 10, 2010 to the CEC, Tessera Solar provided two revised project alternatives identified as Scenarios 5.5 and 6. These scenarios move the northern project boundary south avoiding Sections 4 and 5 as well as make other adjustments. The project layout and proposed drainage patterns for Scenario 5.5 is overlaid on a recent aerial photograph and is shown in Exhibit 5. As can be seen from the aerial photo, the site is still subject to random flood flow paths characteristic of active alluvial fans. Instead of benign, shallow sheet flow spreading out over the surface of the desert floor, water emanating from the Cady Mountains will concentrate in existing drainage paths as well as new ones created during a flood event. This is why critical infrastructure on alluvial fans should have

structural flood control measures to collect and convey floodwater around and/or through the project.

A review of the proposed project alternative in a letter from Tessera Energy dated February 12, 2010 to the CEC shows Figure 12 from URS. This plan indicates that a series of stormwater collection devices on the northern boundary would partially separate the project from stormwater flow from the Cady Mountains. This essentially surrounds the project and addresses the uncertainty of flow paths on the alluvial fans. This approach could be designed in a way such that sediment passes through the system and not trap sediment. In fact, bypassing sediment through constructed flood control facilities is a common practice in desert regions both to reduce maintenance and to preserve the environment downstream. Even though Scenarios 5.5 and 6 are moved further from the base of the mountains, eliminating flood protection measures at the northern boundary will subject the site to the full force of alluvial fan flooding.

Q.3 Do you have an opinion on whether the sediment, erosion, and flooding studies prepared by Howard H. Chang Ph.D., P.E. are inadequate, factually incorrect, and do not propose required



mitigation to protect the proposed Calico Solar Project and prevent impacts to the BNSF right of way?

A.3 In the study by Howard H. Chang, Ph.D., P.E. entitled Sediment Study for Washes at Calico Solar Project Site in San Bernardino County (Original Chang Study) dated July, 2010, no discussion of the unpredictability of flood flows from alluvial fans is presented. In a paper dated November 1982 entitled Fluvial Hydraulics of Deltas and Alluvial Fans, Dr. Chang state, "Streams on deltas and alluvial fans that are formed in noncohesive alluvium are characterized by unstable channel geometries."<sup>5</sup> However, he does not include the unstable and unpredictable nature of channel behavior in the alluvial fan analyses for the Calico Solar Project site.

The Original Chang Study relies on the use of a hydraulic and sediment transport computer program known as FLUVIAL-12. It should be noted that this computer program is not on the list of programs accepted by FEMA for use in analyzing floods on alluvial fans nor for use in rivers (See Exhibit 6). Estimates of pier scour depth for the 2-foot diameter foundation for each of the proposed solar devices range from 3.14 feet to 4.61 feet deep based on the depth of

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<sup>5</sup> Chang, H.H. Fluvial Hydraulics of Deltas and Alluvial Fans. ASCE Journal of the Hydraulics Division. November 1982.

water flow (page 17). However, the standard formula from the Federal Highway Administration referenced on page 11 of the Original Chang Report is incorrect.

The Federal Highway Administration (FHWA) formula for local scour around round-nosed piers/bents or cylindrical piers/bents is incorrectly quoted in Dr. Chang's July 2010 report. The actual formula in Hydraulic Engineering Circular No. 18, labeled as Equation 6.1, reads as follows<sup>6</sup>:  $y_s/y_1 = 2.0 * K_1 * K_2 * K_3 * K_4 * (a/y_1)^{0.65} * Fr_1^{0.43}$ . These factors are important to consider in order to estimate scour depths for alluvial fans.

Furthermore, a review of the FLUVIAL-12 computer program output file labeled FAN-WASH.TXT indicates that the water flow calculations were based on a hypothetical channel carrying only 40 cubic feet per second (cfs) of flood water. Whereas, Figure 4, Page 9 shows a hydrograph involving a maximum flow of approximately 10,000 cfs. Combining the use of an incomplete scour equation and underestimating the amount of stormwater flow through the site means that both the depth and length of scour holes around the 2-foot diameter piers could be much greater than

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<sup>6</sup> Federal Highway Administration. Hydraulic Engineering Circular No. 18. Evaluating Scour at Bridges Fourth Edition. Publication No. FHWA NHI 01-001, May 2001. Available online at: [http://www.fhwa.dot.gov/engineering/hydraulics/library\\_arc.cfm?pub\\_number=17&id=37](http://www.fhwa.dot.gov/engineering/hydraulics/library_arc.cfm?pub_number=17&id=37). Accessed September 17, 2010.

reported and could impact natural flow patterns which ultimately impact down gradient areas, including the BNSF right of way.

On September 8, 2010 Dr. Chang prepared a report entitled Assessment of Detention Basins / Debris Basins for Calico Solar Site (Revised Chang Report). In this report, he recommends the removal of what are referred to as basins from the northern boundary of the Calico Solar project. My examination of the actual function of the proposed basins would be to funnel offsite stormwater into discrete, discernable flow paths. The decision to eliminate all of the flood hazard control at the northern boundary of the Calico Solar Project is unsound as the projected stormwater flows cited in the Original Chang Study are on the order of 10,000 cfs. Should a significant portion of the flow be concentrated in a flow path that does not exist today, it could damage the Calico Solar Project. Furthermore, the localized scour around the cylindrical concrete foundations of the proposed SunCatchers could be much greater than predicted by the Original Chang Study and divert floodwaters to areas along and within the BNSF right of way this could undermine the track embankment and the bridge crossings.

In the Original Chang Study, the predicted scour depth around the 2-foot diameter foundation post supporting the SunCatchers assumes water spreads as sheet flow. This assumption does not account for the random effects of hazardous flows on alluvial fans where a large percentage of the water from the apex of the alluvial fan reaches the pier rather than spreading out and dissipating. The original option of collecting and funneling offsite flows into discrete flow through paths is reasonable and necessary.

I do not believe this type of critical flood protection element at the northern boundary of the Calico Solar Project should be eliminated as an option in the proposed hydrology study.

Q.4 Does the currently proposed Calico Solar Project ignore potential flood hazard impacts on the existing BNSF Right of Way, I-40, and to the project itself?

A.4 The original proposal from the applicant to the CEC showed that there would be floodwater collection devices, detention basins, debris basins, or some other type of device to better control the uncertainties of hazardous

flood processes on the alluvial fans at the northern boundary of the proposed Calico Solar Project.

The Revised Chang Report, filed with the CEC, states that flood control measures at the northern boundary are not necessary. In fact, according to Dr. Chang, attempts at mitigating the alluvial fan flooding hazards could actually harm the Calico Project.

In response to Dr. Chang's declarations to the CEC, the project engineers from URS decided to adopt a policy of reaction rather than one that includes direct flood hazard mitigation. The proposed approach by the project proponent is to wait and see what happens after a 5-year 24 hour storm which amounts to more than 1.5 inches of rain in one day. For desert environments, this amount of rain in one day can be problematic. These characteristics of desert environments are confirmed by the Huitt Zollars study and the West Consultants Appendix therein. In my experience, even after one-half inch of rain in this region, both roads and railroads are inspected for damage. Based on NOAA Atlas 14, the most recent compilation of rainfall statistics in the desert region, the 100-year storm amounts to more than 3 inches in 24 hours, which can cause severe erosion and deposition.

Q.5 What is the history of flood hazards related to railroad transportation in the Mojave Desert Region of California as it pertains to the this project?

A.5 The history of floods occurring in the Mojave Desert Region of California is documented in numerous hydrologic and geologic publications including some that stem from reconnaissance surveys and assessments performed in the early Twentieth Century. The United States Department of Interior Geological Survey (now the United State Geological Survey, USGS) noted in 1929 that there are substantial flood risks in the Mojave Desert:

Storms, especially those occurring in the summer, frequently do great damage. At several places the crops of entire ranches have been washed away or buried by debris in a single storm. Large sums of money have been expended in protecting railroads from the floods that rush down from the mountains. Large drainage channels several thousand feet long are constructed to lead the floods to specially protected culverts, and concrete walls have been built at a

number of places to protect the Atchison, Topeka & Santa Fe Railway. In spite of all these protective works sections of track are washed out every few months. Considerable damage is also frequently done to highways. Strangely enough, in this land, of little rain the monetary losses due to excessive rainfall probably exceeded those due to all other climatic conditions.<sup>7</sup>

Q.6 Do the Chang reports ignore the impacts of increasing the concentration of rainwater on localized areas of soil in desert environments and the detrimental effect of superimposing a gridded road system that does not follow the natural stormwater flow direction?

A.6 The railroad track in question has suffered damage from activities related to intensive adjacent land use. For example, in Hesperia and Victorville, California, large scale residential development decreased the ability of desert soils to absorb rainfall and directed ever

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<sup>7</sup> US Department of the Interior Geological Survey. Water-Supply Paper 578 The Mohave Desert Region California. United States Government Printing Office, Washington. 1929. Available at: [http://ngmdb.usgs.gov/Prodesc/proddesc\\_24591.htm](http://ngmdb.usgs.gov/Prodesc/proddesc_24591.htm). Accessed September 14, 2010.

increasing amounts of stormwater runoff toward the BNSF track. In the storms of 1992 and 1993, extreme erosion occurred near the tracks. This problem of increased impervious surfaces on desert lands and the concentration of the resulting water culminated on August 14, 2004 when the BNSF track at Milepost 39 and 41 in the Cajon Subdivision was undermined by stormwater runoff and collapsed (See Exhibit 7).

The September 15, 2010 Applicant's Submittal of Response to Sierra Club Data Requested on September 14, 2010 briefly discusses the changes in hydrology, drainage, erosion, and sedimentation that would result by adopting reduced footprint project scenarios. In the response to this query regarding potential impacts, it is explained that there is 3.14 square feet per 0.28 acres of the project site and that this relation is "too small...to cause significant impacts."<sup>8</sup> However, this statement is only referring to the concrete pedestal of the solar device.

The August 2010 Testimony by Marie McLean, James Jewell, and Alan Linsley, AIA discuss Traffic and Transportation

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<sup>8</sup>This is discussed on Page 7 of the September 15, 2010 letter from Felicia L. Bellows of Tessera Solar to Christopher Meyer of the California Energy Commission regarding the Calico Solar (formerly Solar One) Project (08-AFC-13) Applicant's Submittal of Response to Sierra Club Data Requested September 14, 2010.



matters related to the Calico Solar Project. This document states that approximately 34,000 SunCatchers are proposed for the project, each of which is 11.5 meters (approximately 38 feet) in diameter. The area of each solar unit is approximately 1,130 square feet. These units rotate to take advantage of the angle of the sun and theoretically could be tilted or put in a "store" mode to minimize the interception of rainfall. However, rain does not always fall vertically downward. Winds can cause the rain to fall at an angle and could strike the solar panel. The resulting runoff could concentrate and create localized runoff. The project also includes a 14.4 acre "main services complex" and a 2.8-acre substation.<sup>9</sup> The only mitigation plan being proposed is to build a detention basin for increased runoff from the main services complex. The change to the local hydrology that could be caused by an approximate 24,000 SunCatchers is not acknowledged.

Item B.1.4.1 of the Staff Assessment and DEIS discusses that the original project has approximately 25 miles of paved roads, 168 miles of North-South dirt roads, and 102 miles of East-West Dirt Roads. The dirt roads are to be treated with a polymer for dust control and stabilization.

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<sup>9</sup>Appendix C.11 - Traffic and Transportation. Testimony of Marie McLean, James Jewell, and Alan Lindsley, AIA. August 2010.

Increased runoff can be expected to occur as a result of the roads. Even the dirt roads will have decreased infiltration capacity from rainfall due to compaction by vehicle traffic and the hydrophobic nature of the chemicals typically applied to dirt roads.

The road systems used to access and maintain the solar panels are arranged in a North-South and East-West grid. This is contrary to the natural flow direction of water and debris along the alluvial fan is from Northeast to Southwest. Ultimately the system of dirt roads will serve as flood conveyance paths during large storms and change the way that water reaches the BNSF track potentially concentrating and eroding the track embankment.

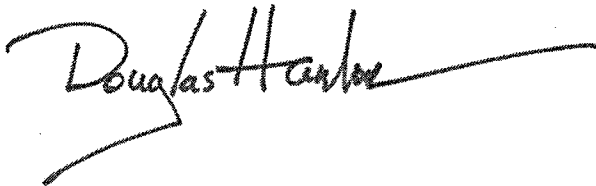
The issues above are indicators that there are substantial impacts to land use resulting from the proposed Calico Solar Project including increased runoff and sediment transport. The Revised Chang Report essentially eliminates upstream flood protection on the Northern project boundary and does not revise, correct, or explain why it is prudent to deviate from the Geomorphic Hazard Map in the Huitt Zollars report. Furthermore, none of the 5 proposed flood protection alternatives from the Huitt Zollars report have been carried over to the Revised Chang Report. I agree with

the Huitt Zollars report that without including some structural flood mitigation measure on the northern project boundary, that the solar units, and other infrastructure will be subject to severe and damaging flooding and erosion. Unmitigated, such damage and erosion will impact the BNSF railroad embankment by altering existing flow paths, increasing flood runoff, and increasing the amount of sediment and debris that will reach the BNSF tracks.

I declare under penalty of perjury that the foregoing is true and correct and that this declaration was executed on September 17, 2010 at Irvine, California.

Douglas Hamilton, P.E.

Registered by the California Board of Professional Engineers No. 42210

A handwritten signature in black ink, reading "Douglas Hamilton". The signature is written in a cursive style with a long horizontal line extending to the right.



**BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT  
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**APPLICATION FOR CERTIFICATION**

***For the CALICO SOLAR (Formerly SES Solar One)***

**Docket No. 08-AFC-13**

**PROOF OF SERVICE  
(Revised 8/9/10)**

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### DECLARATION OF SERVICE

I, Ani Seferyan, declare that on October 25, 2010, I served and filed copies of the attached "Attachment L - Exhibit 1211" dated October 25, 2010. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [\[www.energy.ca.gov/sitingcases/solarone\]](http://www.energy.ca.gov/sitingcases/solarone).

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

*(Check all that Apply)*

#### FOR SERVICE TO ALL OTHER PARTIES:

- ☒ sent electronically to all email addresses on the Proof of Service list;  
☐ by personal delivery;  
☐ by delivering on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses **NOT** marked "email preferred."

**AND**

#### FOR FILING WITH THE ENERGY COMMISSION:

- ☒ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (*preferred method*);

**OR**

- ☐ depositing in the mail an original and 12 paper copies, as follows:

#### **CALIFORNIA ENERGY COMMISSION**

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1516 Ninth Street, MS-4  
Sacramento, CA 95814-5512  
[docket@energy.state.ca.us](mailto:docket@energy.state.ca.us)

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

\_\_\_\_\_  
/s/ Ani Seferyan  
Ani Seferyan

# **STATE OF CALIFORNIA**

## **Energy Resources Conservation And Development Commission**

In the Matter of:  
The Application for Certification  
for the Calico Solar Power Project  
Licensing Case

Docket No. 08-AFC-13

### **INTERVENOR BNSF's COMMENTS ON THE PMPD**

## ATTACHMENTS

A	Exhibit 1200
B	Exhibit 1201
C	Exhibit 1202
D	Exhibit 1203
E	Exhibit 1204
F	Exhibit 1205
G	Exhibit 1206
H	Exhibit 1207
I	Exhibit 1208
J	Exhibit 1209
K	Exhibit 1210
L	Exhibit 1211
M	Exhibit 1212
N	Exhibit 1213
O	Exhibit 1214
P	BNSF Post-Hearing Brief
Q	BNSF Comments and Protests to FEIS
R	BNSF Supplemental Comments and Protests to FEIS
S	Sierra Club's PMPD Comments
T	CURE's PMPD Comments



# STATE OF CALIFORNIA

## Energy Resources Conservation And Development Commission

In the Matter of:  
The Application for Certification  
for the Calico Solar Power Project  
Licensing Case

Docket No. 08-AFC-13

**PREPARED DIRECT TESTIMONY OF STEVEN J. METRO, PE**  
**Senior Civil Engineer, Wilson Company**

September 14, 2010

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Attorneys for Intervenor  
BNSF Railway Company

PREPARED DIRECT TESTIMONY

OF

Steven J. Metro, PE

Senior Civil Engineer, Wilson Company

Q.1 Please state your name and occupation?

A.1 My name is Steven J. Metro. I am a Senior Civil Engineer with Wilson Company. Wilson Company is a civil engineering and consulting company. Approximately one fourth of all of our work is for the railroads. The company has completed at least 30 drainage and flood studies for railroad bridges throughout the Southwest.

Q.2 What is your particular area of expertise?

A.2 I am a licensed professional engineer. I have particular experience in drainage and flooding issues and have worked on numerous matters involving the railroads. I have worked on over twenty matters involving drainage and flooding issues in a desert environment with alluvial fans. I have seen first hand the effects of flooding caused by structural improvements placed upgradient from a railroad right-of-way. In my practice, I routinely interface with Army Corps of Engineers and local flood control districts. I have provided expert testimony regarding flood damage to railroad infrastructure. A copy of my *curriculum vitae* is attached hereto as Exhibit "A."

Q.3 What is the purpose of your testimony?

A.3 To outline the concerns that BNSF has regarding the current two alternatives being proposed by Applicant, Alternative 5.5 and 6, which completely eliminate the debris basins and detention basins that were critical safety features and mitigation measures of the proposed project for many months. The Record in this matter clearly reflects that upon reviewed of the proposed project, Applicant experts acknowledged and Staff experts found that the proposed project would adversely impact the storm water runoff over and through the area encompassing the proposed project. This adverse impact is a result of the fact that the placement of over 24,000 SunCatchers, foundations and pads for the main service complex and substation, the hundreds of miles of access and service roads, and associated structures required to support the proposed project, which will necessarily decrease the surface area that will allow absorption of storm water and the day-to-day operations associated with the facility that will create new channels throughout the site. The impervious nature of these structures and facilities and the newly created channels will result in an increase flow of stormwater and will alter the already shifting and unpredictable nature of the streambeds within the alluvial fans in the proposed project area. In turn, this will have an adverse impact on the BNSF Right-of-Way that runs through the proposed project in that the BNSF Right-of-Way will necessarily encounter increased flows and sediment deposits along the Right-of-Way as a result of the proposed project. This will result in an increased risk of flooding and scour that the existing trestles and Right-of-Way grade may not be able to accommodate. Ultimately this could result in an increased potential to wash out portions of the BNSF Right-of-Way and



portions of the transcontinental mainline track, interrupting a critical interstate transportation artery. To mitigate this significant safety risk and environmental hazard, both Applicant and the Staff proposed a network of debris basins on the northern boundary of the proposed project site, upgradient of the BNSF Right-of Way. These debris basins would be designed to capture some but not all of the storm water and associated debris from the Cady Mountains. Through storage and a gradual release of the storm water from the debris basins down to a series of detention basins strategically located within the proposed project site itself, Applicant and Staff planned to abate and mitigate the adverse and potentially catastrophic impact of storm water runoff on the BNSF Right-of-Way. Staff found that the installation of these basins would reduce the project's impact on site hydrology to less than significant. While the specific plans for the debris basins and detention basins had not been designed and were pending a comprehensive hydrology study, the general scheme of debris basins and detention basins was a major component of the proposed project for well over a year. The Energy Commission Certification Committee for the Calico Solar Project issued an order on September 3, 2010 finding that it could not support certification of the proposed project. The Committee order was based on a finding that the proposed project's impact on critical habitat outweighed the potential benefit of the proposed project. The September 3<sup>rd</sup> order noted that it would reconsider the proposed project if it were revised to reflect a smaller footprint that did not adversely impact so much critical habitat. In response, Applicant proposed six alternatives on September 7, 2010, all of which eliminated the

debris and detention basin safety and mitigation measures. After a workshop on September 9, 2010, the Applicant further refined its proposed revised project to two alternatives, 5.5 and 6. Again, both of these alternatives eliminate the debris and detention basin safety and mitigation measures. Before further discussing these alternatives, however, I think it is important to review the Record in this matter in relation to debris and detention basins. I have reviewed the history of debris and detention basins in the Record in this matter in order to form the opinions contained herein. My observations follow:

#### **Chronology of References to Debris and Detention Basins**

December 2, 2008. Application for Certification ("AFC"). AFC notes that the Project Area is an unmapped area by FEMA. FEMA designates the Project Area as a "Zone D" area – meaning it is possible but undetermined flood hazards. [AFC at 5.5-6.] AFC notes that a 100-year flood<sup>1</sup> will flow southwest from the Cady Mountains through the Project Area. Flooding will pass through the BNSF RoW trestles and along the RoW. According to the AFC, "[t]he Project will not adversely affect existing drainage features. The existing flooding patterns will remain once the Project is constructed. [AFC at 5.5-10.]

By April 2009, Applicant had responded to numerous data adequacy requests and noted that, "[f]rom a surface water perspective, the Project will create new impervious surfaces that will have the potential to create additional runoff and subsequent erosion and sedimentation." [Supplemental Response

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<sup>1</sup> To put this in perspective, there is a one percent probability that a catastrophic storm of a specific magnitude could occur in any given year. Personally, I am aware of two 100-year intensity flood events happening in 2006 in Albuquerque, NM.

at WATER-1.] Best Management Practices ("BMP's") being considered by the Applicant include "sediment basins" and "detention/infiltration basins." [Supplemental Response at WATER-11.]

After a series of workshops covering various aspects of the Project, Applicant submitted in February 2010 a Drainage Layout Figure that reflects a series of "debris basins" along the northernmost border of the Project Site. [February 12, 2010 Drainage Layout Figure.]

On March 30, 2010, the CEC and BLM issued the Staff Assessment/Draft Environmental Impact Statement ("SA/DEIS"). According to the Executive Summary, "[t]hese project debris basins are designed to retain storm water discharge and associated debris resulting from a 100-year flood." [SA/DEIS at ES-5.] The SA/DEIS noted that the debris basins were located on the northernmost border of the Project Site and, if the Site footprint was reduced under the Reduced Acreage Alternative [as it was], that the "flood intercept debris collection and flow detention basins would need to be similarly designed and constructed downstream from the southern boundary [of the lands no longer included in the Project Site as a result of the Reduced Acreage Alternative]." Assuming this was done, there would be "no change to the CEQA Level of Significance Impact." [SA/DEIS at ES-24 (implying that failure to do so would constitute a change to CEQA Level of Significance Impact).

Under the Biological Resources Section, the SA/DEIS identified thirteen major components of the Proposed Project, including "[s]tormwater



detention basins, debris basins, and diversion channels." [SA/DEIS at C.2-11.]

The SA/DEIS Section on Hydrology/Soil & Water makes a finding that the proposed project "could result in impacts that would be significant with respect to California Environmental Quality Act significance criteria specified herein and National Environmental Policy Act significant criteria specified in 40 CFR 1508.27," and makes it clear that the detention basins are an essential mitigation measure in the Project.

"A Draft Drainage, Erosion, and Sedimentation Control Plan mitigates the potential project-related storm water and sediment impacts.

However, the calculations and assumptions used to evaluate potential storm water and sedimentation impacts are imprecise and have limitations and uncertainties associated with them such that the magnitude of potential impacts that could occur cannot be determined precisely. Based on these factors, the proposed project could result in impacts that would be significant with respect to California Environmental Quality Act significance criteria specified herein and National Environmental Policy Act significant criteria specified in 40 CFR 1508.27. Therefore, Conditions of Certification

**SOIL&WATER-1, SOIL&WATER-2 and SOIL&WATER-3** have been developed that define specific methods of design analysis, development of best management practices, and monitoring and reporting procedures to mitigate impacts related to flooding, erosion, sedimentation, and stream morphological changes. Compliance with

[Laws, Ordinances, Regulations and Standards ("LORS")], particularly the Clean Water Act requirements, will insure no adverse impacts to waters of the U.S. **With implementation of these Conditions,<sup>2</sup> the potential effects of the proposed project would be less than significant.** The applicant has not provided information necessary to complete the development of requirements for dredge and fill in waters of the state. Once the applicant provides this information staff can complete the development of requirements that will be included in Condition of Certification."

[SA/DEIS at C.7-1-C.7-2 (emphasis added).]

The SA/DEIS makes it clear that there will be impacts to the BNSF RoW:

"Localized channel grading is proposed to take place on a limited basis to improve channel hydraulics in the vicinity of BNSF railway right-of-way to control the surface runoff. In addition, the Main Services Complex will be protected from a 100-year flood by berms and/or channels that will direct the flow around the perimeter of the building site, if required.

The proposed arterial roadway section between the Main Services Complex and I-40 will be a designated evacuation route. As such, the driving surface will be constructed at an elevation above the projected profile of a 25-year storm event. In addition, overflow resulting from the 100-year storm event will be limited to a depth not to exceed 7 inches. It is anticipated that roadway maintenance will be required after rainfall events. For minor storm events, in

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<sup>2</sup> These Conditions of Certification evolved into SOIL&WATER-8.



addition to the aforementioned maintenance, roadway repairs may be required due to possible damage to pavement where the roadway crosses the channels and where the flows exceed the culvert capacity. Soft bottom storm water detention basins will be constructed to mitigate the increase in runoff from the proposed building sites. Rainfall from paved areas and building roofs will be collected and directed to the storm water detention basins. The storm water detention basins will be sized to hold the entire volume from the proposed building sites resulting from a 24-hour, 100-year storm. The detention basin will be designed so that the retained flows will empty within 72 hours after the storm to provide mosquito abatement. This design can be accomplished by draining, evaporation, infiltration, or a combination thereof. The post-development flow rates released from the project site are expected to be less than the pre-development flow rates. Except for the building sites, the majority of the project site will remain pervious, as only a negligible portion of the site will be affected by pavement and SunCatchers foundations. Site drainage during construction will follow predevelopment flow patterns, with ultimate discharge to the BNSF ROW and ultimately at the westernmost property boundary.

Debris basins and/or low-flow culverts consisting of a small diameter storm drain with a perforated stem pipe will be installed for sediment control and to provide for storm peak attenuation.

BMPs for erosion and sediment control will be used in combination with debris basins for roadway crossing of major washes. In the Main Services Complex, the storm water will be directed to a detention basin, where the site runoff will infiltrate and/or evaporate. The detention basin will be sized to meet the San Bernardino County development criteria.

The temporary erosion and sedimentation control measures to be used during construction will be designed to prevent sediment from being displaced and carried off-site by storm water runoff. Before beginning excavation activities, debris basins, silt fence, straw bales, or other BMPs will be constructed/installed along the perimeter of the Project, where minor runoff to off-site areas could occur. Debris basins will be constructed for the major site runoff discharge and will also provide for low flow detention. The silt fence will filter sediments from construction runoff. Berms with perforated risers will be used at road crossings and other locations as needed to control sediment transportation. During construction, the extent of earth disturbances will be minimized as much as practical. A sediment trap will be located immediately upstream of the property boundary.

Diversion swales with berms will be constructed as necessary to divert runoff from off-site areas and on-site undisturbed areas around the construction site. Temporary BMP control measures

will be maintained during the rainy season as necessary throughout the construction period.

[SA\DEIS at C.7-29.]

The Supplemental Staff Assessment of July 21, 2010 ("SSA") notes that large debris basins are being designed to control runoff and sedimentation. The SSA makes the following finding: "Impacts due to flooding in these areas are potentially significant without adequate mitigation. This leaves portions of the project subject to significant adverse impact due to flooding." [SSA at C.7-2.]

During the evidentiary hearings, Mr. Byall testified for Applicant extensively about the detention basins. According to Mr. Byall, the detention basins are designed, among other things, to reduce the impact on the RoW due to sediment buildup as a result of storms:

What we're trying to do is not create an adverse condition where we will increase scour within the washes themselves and cause degradation of the washes; so we're trying to come up with a balance between what naturally occurs and the interference we're going to cause by installing the SunCatchers and the maintenance that would be required because of that. So it's a little bit of a balancing act.

What we're trying to do is make it so that we don't have to go out after every storm that creates a fair amount of flow and go out and remove a whole bunch of sediment from our at-grade crossings, . . .

[Testimony of R. Byall, 8/6/2010 TR at 35:12-24 (emphasis added).]

Staff Counsel extensively cross examined Mr. Byall and Mr. Moore of Applicant regarding the detention basins and the fact that Applicant kept changing the numbers and sizes of the detention basins. Staff expert Mr. Weaver testified extensively about how Applicant kept changing the numbers and sizes of the detention basins. [See Testimony of C. Weaver, 8/6/2010 TR at 41:11-46:21.]



Moreover, there was extensive cross examination designed to establish that, as of the hearing, Applicant still did not have an actual layout and design of the detention basins. Indeed, Mr. Weaver noted that Applicant testified to yet additional changes to the design plans for the detention basins on the third day of evidentiary hearings in Barstow.

MS. HOLMES: And this morning you heard testimony about yet additional changes to the proposed plans; is that correct?

MR. WEAVER: Yes, just this morning.

[Testimony of C. Weaver, 8/6/2010 TR at 46:22-25.]

Mr. Weaver explained that it was very difficult for Staff to deal with the uncertainty regarding the design of the debris and detention basins, but that "Soil and Water 8 was written to assure that the applicant will develop an appropriate design and will construct adequate flood control features that will protect the site from flooding hazards." [Testimony of C. Weaver, 8/6/2010 TR at 47:17-20.]

As Mr. Weaver further explained, "[c]ompliance with Soil and Water 8 will protect the project from flow – excuse me, from flood hazards resulting from the hundred-year storm while allowing pass-through of flows resulting from smaller storms to replenish sediment in channels allowing groundwater recharge along the drainages which will maintain the function of the desert washes." [Testimony of C. Weaver, 8/6/2010 TR at 47:21-48:2.] After Staff counsel noted that Applicant had asked that same morning to substitute SOIL&WATER-8 and that Staff opposed this request, counsel for applicant stipulated to SOIL&WATER-8:

MS FOLEY GANNON: Hearing Officer Kramer, Ms. Holmes, we have an offer to make that may simplify some of this discussion.

The applicant is willing to stipulate to Soil and Water 8 and agree with its inclusion.

[8/6/2010 TR at 49:1-5.]

Until the development of Alternatives 1 through 6 and Dr. Chang's report of September 8 with requested change to SOIL&WATER-8, SOIL&WATER-8 clearly called for detention basins. In reliance on Applicant's stipulation, Staff shifted to a different topic. Moreover, BSNF did not examine Mr. Weaver based on Applicant's stipulation to SOIL&WATER-8. Furthermore, the day before, on August 5<sup>th</sup>, counsel for BNSF specifically asked Applicant if it would agree that the proposed Condition of Certification in the written testimony of Thomas Schmidt, Exhibit 1102, was reasonable, to include the following language – "applicant represents that applicant will deliver the following documents to BNSF: 1) Final drainage report; 2) final detention basin designs/plans; and 3) maintenance plan. At the time of delivery applicant will address any comments or concerns of BNSF. If there are any amendments to these documents or if there are alterations to any of the detention basins applicant will deliver such revisions to BNSF. " [8/5/2010 TR at 330:18-25.] Hearing Officer Kramer asked, "Does any party want to comment on that, including the applicant, on that? I guess it's more or less a stipulation." [8/5/2010 TR at 331:20-222.] To which counsel for Applicant responded, "No, we agree to the language." [8/5/2010 TR at 331:23.]<sup>3</sup>

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<sup>3</sup> Consistent with this stipulation, before the close of the evidentiary hearings on August 25<sup>th</sup>, counsel for Applicant confirmed the stipulation. Applicant clarified that Applicant agreed to pay for a hydrology study by an expert of BSNF's choosing and that Applicant would pay for all necessary mitigation measures: "MS. FOLEY GANNON: So we said, 'Prior to installing any SunCatchers or construction of the detention basins, project owners shall pay for a hydrology study commissioned by BNSF, which will determine the impact, if any, on the rail safety and BNSF operation of its planned placement of SunCatchers and detention basins and determined appropriate mitigation measures, if necessary, to be paid for by project owner.'" [8/25/2010 TR at 317:10-17.]

The Bureau of Land Management ("BLM"), issued its Final Environmental Impact Statement ("FEIS") on August 3, 2010. The FEIS indicates that the detention basins were included as part of the proposed project to mitigate the adverse impacts that would result from the project. The FEIS Hydrology section states: "Due to the project area's susceptibility to flash flooding and prolonged periods of precipitation, high intensity and short duration runoff events coupled with earth disturbance activities could result in accelerated on-site erosion.... Off-site flow would be intercepted prior to entering the project site using large debris basins constructed on-site and located at the toe of each mountainous drainage basin.... On-site runoff would be intercepted in detention basins which would be sized to retain the 100-year on-site stormwater discharge runoff and debris flows...." [FEIS at 4-362.]

The FEIS further provides that, "The Applicant has conducted mathematical calculations and probabilistic modeling to estimate anticipated potential impacts. Site development for the Proposed Action would result in direct, adverse, long-term impacts on surface hydrology on the project site due to a loss of on-site ephemeral drainages which promote groundwater recharge, flood peak attenuation, floodwater storage, and wildlife corridors and habitat. However, impacts would be localized and would be effectively mitigated with the implementation of mitigation measures required for the Proposed Action." [FEIS at 4-364.]

The FEIS further states: "Migration of channels and local scour caused by stormwater flows could remove sediment supporting individual poles and cause them to fall to the ground. Once on the ground during a storm event, the broken



glass associated with the mirrors could further break and be transported downstream. Also, the SunCatcher structure itself and the associated wiring, could be transported downstream. Although the security fence located on the downstream side of the project site could stop larger pieces from leaving the property, it would not stop small glass fragments. Also, the fence itself could be damaged by stormwater flows and may not guarantee the onsite capture of all damaged materials. The detention/debris basins inside the northern boundary of the project site would be of sufficient size to completely retain flood flows resulting from a 100-year flood. Following significant storms, retained water would be released into the existing channels in a controlled and metered manner at a rate that is designed to not cause damage to SunCatcher pole foundations located within the channels." [FEIS at 4-371-372.]

Under the FEIS, the proposed mitigation measures for the proposed project include that the Applicant must obtain both BLM's Authorized Officer's and the Committee Presiding Member's approval for a site specific Drainage, Erosion and Sediment Control Plan (DESCP) that ensures protection of water quality and soil resources of the project site and all linear facilities for both the construction and operation phases of the project, and the DESCP must meet a number of requirements set forth in the FEIS. [FEIS at 4-379.] Also, the Applicant must ensure that all SunCatcher pole foundations are designed to withstand stormwater scour from surface erosion and/or channel migration, and that a stormwater Damage Monitoring and Response Plan be developed to evaluate potential impacts from stormwater. [FEIS at 4.382.]

As recently as August 26, 2010, Applicant submitted its proposed SOIL&WATER-8 to the CEC Committee. SOIL&WATER-8 specifically included detention basins. [See Exhibit 113.]

On September 8, 2010, in response to the CEC Committee's request that the Applicant consider a smaller project site, Applicant submitted a report by Howard Chang, Ph.D, P.E., which now recommends that detention basins not be installed. Dr. Chang's report contains a revised SOIL&WATER-8 that excludes any reference to detention basins.

On September 13, 2010, Applicant submitted testimony in support of two proposed reduced acreage sites within the proposed project area – Alternate 5.5 and 6. Both Alternatives eliminate any debris or detention basins. Dr. Chang makes no reference to the fact that Applicant and Staff had, for over a year, recommended that the project site be constructed with a scheme of debris and detention basins to control stormwater impact. According to Dr. Chang's testimony he does not recommend the installation of detention basins because they "can be a safety hazard for SunCatchers" and because of the "potential adverse impacts of the detention basins on the fluvial system." [Chang Report at p. 14.] Mr. Byall made no reference to his prior recommendation that the project site include detention basins and testified in a conclusory manner that "[n]o debris or detention basins are planned for the site." [Byall at p. 1.] Mr. Moore testified that "[i]t is likely that additional maintenance will be required on the project site in the absence of the previously proposed detention basins." [Moore at ¶6.] Ms. Bellows has requested that SOIL&WATER-8 be modified to delete any reference to debris and detention basins. [Bellows at pp. 3-4.]



Q4 Have you reviewed the testimony of Dr. Chang and Messrs. Byall and Moore submitted by Applicant in support of Alternatives 5.5 and 6?

A.4 Yes, I have.

Q.5. In your opinion, is there adequate support for Dr. Chang's conclusion that detention basins are not recommended?

A.5. No.

Q.6 Why not?

A.6 Dr. Chang asserts that "the proposed solar units will have insignificant effects on the arid-land hydrology of the project site." I disagree. The Record is clear that stormwater flows across the proposed site in a southwesterly direction until it reaches the BNSF Right-of-Way, and then flows west. This has the most direct and significant impact on Sections 07 and 12 within the proposed project site. Before the Applicant was told it had to reduce its project site footprint, both Applicant experts – Messrs. Byall and Moore, as well as Staff expert Mr. Weaver – all agreed that the placement of the SunCatchers, together with the main service complex and substation foundations and pads, the hundreds of miles of roadways that interlace the project site and afford Applicant the ability to perform maintenance on the site, and other features and structures that will necessarily be built on the site will adversely affect the stormwater flow on the site. In turn, this will likely cause increased sediment build up along the BNSF Right-of-Way and also increase the risk of adverse impacts to backslopes, ditches, culverts, and trestles within the Right-of-Way. Ultimately, it will increase the risk of stormwater disrupting the transcontinental mainline. There is ample evidence of this fact and Dr. Chang does not present any evidence to the contrary. Contrary to Dr. Chang's assertions, alluvial fans are not stable and are not

at equilibrium. The arid desert region, such as the proposed project area in the Mojave Desert, is subject to flash flood type events that leave new sediment deposits after every event. When a subsequent flood occurs it may establish a new route to the valley floor. This creates a system of braided stream channels found in most alluvial fans. Dr. Chang has oversimplified the complex morphology of this region in particular and alluvial fans in general.

In my professional experience, when structures are built upgradient of the Right-of-Way along an alluvial fan in a desert environment there is increased runoff and erosion along the Right-of-Way and typically we see backslope, ditch and culvert damage. This is simply because the structures on the upgradient development reduce the ability of the respective property to absorb stormwater, which in turn results in increased flow and increased damage. Dr. Chang's analysis does not appear to take this into account. Ultimately, the stormwater can wash out a track and cause substantial damage and lengthy interruptions in train service.

The BNSF Railway Company has experienced heavy rainfall events in this area with the water surface rising against the bridge girders. However, there is no record of historic floods overtopping the tracks. This historic flooding demonstrates that the current drainage system does not have additional capacity to spare and it is critical that the proposed Calico Solar development maintain historic flows. Any increases in flows or sediment to the railroad drainage could result in overtopping of the railroad tracks. Therefore the BNSF Railway Company requires more substantial analysis for the hydrology of the proposed development to demonstrate that the construction of 24,000 sun catcher, miles of maintenance roads, a 90 acre substation

and the associated construction disturbance to the desert top soils will not change the existing drainage to the railroad structures.

Q.7 What is your opinion about the impact of emplacing the SunCatchers and associated infrastructure on the proposed Alternative 5.5 or Alternative 6?

A.7 In relation to this site, there will be over 24,000 SunCatchers placed in a tight grid over the site. Each SunCatcher has a 2 foot circumference base pedestal, which will be impervious to stormwater absorption and will act as a barrier to channelize stormwater, causing what is referred to as scouring around the base of the pedestal. Both Alternatives include provision for a large main services complex and a substation, with associated foundations and pads. Additionally, I understand that there will be an improved roadway along the entire border of the site and then access/maintenance roads between every other row of SunCatchers. The total estimated roadway is hundreds of miles. While not all of the roads will be paved, I understand all roads may be all-weather roads, which will be graded and either paved or treated with Soiltec or a similar substance to keep dust down. The resulting effect is that these roads will act as at least partial impervious barriers to the absorption of stormwater and will channelize stormwater flow and disrupt the natural flows of the alluvial fan. In addition, Applicant plans to place the SunCatchers as close together as physically possible in order to maximize the concomitant megawatt output from increased SunCatchers. While they will be "stowed" during a storm, the rainfall will naturally flow along the "stowed" surface of the SunCatcher, ensuring that the stormwater will run off the SunCatchers in a different fashion than if the site remained in its natural state, without SunCatchers.

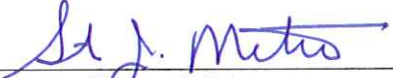


Q.8 In your opinion, given the current state of hydrological analysis and issues raised by Calico Solar as recently as this week, does BNSF have sufficient information to analyze and grant Calico Solar's four requests for licenses and crossings on the BNSF ROW?

A.8 No. In the absence of an adequate study and in light of the issues raised by the Applicant through Dr. Chang's declarations and studies and Mr. Moore's declaration of September 13, 2010, it is not possible to analyze the safety or compatibility concerns raised by the requests that (1) BNSF allow it to drive hundreds of trucks and cars over the ROW; (2) BNSF build a new temporary at-grade crossing for Calico Solar's use in the ROW; (3) BNSF allow it to build a bridge over the BNSF ROW; and (4) BNSF allow an expansion of an at-grade crossing's use to allow for emergency access to the Calico Solar site. The proper studies, including hydrological, need to be completed. In addition, Calico Solar needs to disclose what is being referred to by the statement of Matt Moore of URS when he states that: "Existing sedimentation and maintenance issues at railroad facilities represent an existing condition that would not be significantly altered by Scenario 5.5 or 6." Once this information is obtained, BNSF will need time to evaluate if such uses and infrastructure are compatible with railroad infrastructure and operations and where they might best be located. BNSF needs to be provided the precise location of all SunCatchers and related infrastructure so it can assess potential impacts on the ROW that need to be considered in processing Calico Solar's applications. Until this occurs, BNSF is not in a position to grant the requested licenses and crossings.

I swear under penalty of perjury that this testimony is true and correct to the best of my knowledge and belief.

Dated: September 14, 2010

  
\_\_\_\_\_  
Steven J. Metro



**BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT  
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1-800-822-6228 – WWW.ENERGY.CA.GOV**

**APPLICATION FOR CERTIFICATION**

***For the CALICO SOLAR (Formerly SES Solar One)***

**Docket No. 08-AFC-13**

**PROOF OF SERVICE  
(Revised 8/9/10)**

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### DECLARATION OF SERVICE

I, Ani Seferyan, declare that on October 25, 2010, I served and filed copies of the attached "Attachment M - Exhibit 1212" dated October 25, 2010. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [\[www.energy.ca.gov/sitingcases/solarone\]](http://www.energy.ca.gov/sitingcases/solarone).

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

*(Check all that Apply)*

#### FOR SERVICE TO ALL OTHER PARTIES:

- ☒ sent electronically to all email addresses on the Proof of Service list;  
☐ by personal delivery;  
☐ by delivering on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses **NOT** marked "email preferred."

**AND**

#### FOR FILING WITH THE ENERGY COMMISSION:

- ☒ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (*preferred method*);

**OR**

- ☐ depositing in the mail an original and 12 paper copies, as follows:

#### **CALIFORNIA ENERGY COMMISSION**

Attn: Docket No. 08-AFC-13  
1516 Ninth Street, MS-4  
Sacramento, CA 95814-5512  
[docket@energy.state.ca.us](mailto:docket@energy.state.ca.us)

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

\_\_\_\_\_  
/s/ Ani Seferyan  
Ani Seferyan



# **STATE OF CALIFORNIA**

## **Energy Resources Conservation And Development Commission**

In the Matter of:  
The Application for Certification  
for the Calico Solar Power Project  
Licensing Case

Docket No. 08-AFC-13

### **INTERVENOR BNSF's COMMENTS ON THE PMPD**

## ATTACHMENTS

A	Exhibit 1200
B	Exhibit 1201
C	Exhibit 1202
D	Exhibit 1203
E	Exhibit 1204
F	Exhibit 1205
G	Exhibit 1206
H	Exhibit 1207
I	Exhibit 1208
J	Exhibit 1209
K	Exhibit 1210
L	Exhibit 1211
M	Exhibit 1212
N	Exhibit 1213
O	Exhibit 1214
P	BNSF Post-Hearing Brief
Q	BNSF Comments and Protests to FEIS
R	BNSF Supplemental Comments and Protests to FEIS
S	Sierra Club's PMPD Comments
T	CURE's PMPD Comments

# **STATE OF CALIFORNIA**

## **Energy Resources Conservation And Development Commission**

In the Matter of:  
The Application for Certification  
for the Calico Solar Power Project  
Licensing Case

Docket No. 08-AFC-13

### **PREPARED DIRECT TESTIMONY OF DAVID MILLER Manager Engineering, BNSF Railway Company**

September 17, 2010

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Attorneys for Intervenor  
BNSF Railway Company

PREPARED DIRECT TESTIMONY

OF

David Miller

Manager Engineering, BNSF Railway Company

Q.1 Please state your name and occupation?

A.1 My name is David Miller. I am Manager Engineering with BNSF Railway Company ("BNSF"). I have been with BNSF for twenty-eight years and I have an engineering degree.

Q.2 What is your particular area of expertise?

A.2 I oversee construction for BNSF throughout southeastern California and all of New Mexico and Arizona. I am called upon to respond to emergency situations for the railroad. For example, I am called upon to respond to situations where high water erodes track embankment or bridges.

Q.3 What is the purpose of your testimony?

A.3 To outline the concerns that BNSF has regarding the current two alternatives being proposed by Applicant, Alternative 5.5 and 6, which completely eliminate the debris basins and detention basins that were critical safety features and mitigation measures of the proposed project for many months.

Q.4 Why did BNSF not question Calico Solar's hydrology witnesses at the hearings in August?

A.4 BNSF relied on Calico Solar's statements at the hearing in August and Calico Solar's stipulation that it agreed to put detention basins in the project, fund

additional studies, and fully mitigate the anticipated flood hazards associated with its project.

Q.5 In your opinion, given the recent change in alternatives, which delete the debris and retention basins, the current lack of a hydrological study to support the new alternatives, and new issues raised by Calico Solar, does BNSF have sufficient information to analyze and grant Calico Solar's four requests for licenses and crossings on the BNSF ROW?

A.5 No. As of last Friday, September 10, 2010 it was BNSF's understanding Calico Solar was going to again redesign its proposed facility and present an alternative 5.5 and an alternative 6. We received conceptual designs of those 2 alternatives on Friday night. On Monday we received additional reports and declarations by a number of Calico Solar's experts. The alternatives and the expert reports and declarations delete debris and retention basins, provide analyses and conclusions that contradict previous reports, declarations and testimony before the CEC and contain significant changes from what was BNSF's understanding of the potential hydrological impact of the proposed project on the BNSF ROW.

Understandably, our experts have only begun to analyze the new situation. Among Calico Solar's Monday declarations is one by Matt Moore of URS which states "Existing sedimentation and maintenance issues at railroad facilities represent an existing condition that would not be significantly altered by Scenario 5.5 or 6." BNSF does not know what this statement is referring to and will need to know the basis for this statement before it can proceed further with the Applicant's requests of BNSF. If Calico Solar has any concerns with the BNSF ROW, BNSF needs to know what they are at this time as Calico

Solar is requesting: (1) BNSF allow it to drive hundreds of trucks and cars over the ROW; (2) BNSF build a new temporary at-grade crossing for Calico Solar's use in the ROW; (3) BNSF allow it to build a bridge over the BNSF ROW; and (4) BNSF allow an expansion of an at-grade crossing's use to allow for emergency access to the Calico Solar site. BNSF must be advised of and allowed time to evaluate any concerns Calico Solar may have before BNSF can determine if such uses and infrastructure are compatible with railroad infrastructure and operations and where they might best be located. BNSF has asked for a precise location of all SunCatchers and related infrastructure so we can assess potential impacts on the ROW that need to be considered in processing Calico Solar's applications. These include hydrological impacts. To date BNSF has not been provided this information.

Because of the impact these changes may have on BNSF's analysis of the safety and protection of the ROW and whether Calico Solar's proposed uses are compatible with existing rail operations, BNSF has been delayed in processing Calico Solar's applications. There have been numerous changes to the Calico Solar project over the past year and the BNSF staff trying to process Calico Solar's applications has had to redirect its efforts several times. Given the 10 day old change in direction and the presentation of 2 alternatives, BNSF does not know which is the preferred alternative to analyze. Under these circumstances, BNSF is not able to process Calico Solar's four requests and is unable to grant the licenses, easements and crossings at this time.

Q.6 Is there a historical basis for BNSF's concerns relating to heavy rainfall and flooding in the area of the project site?

A.6 Yes. The BNSF Railway Company has experienced heavy rainfall events in this area with the water surface rising as high as the bridge girders. However, there is no record of historic floods overtopping the tracks. This historic flooding demonstrates that the current drainage system does not have additional capacity to spare and it is critical that the proposed Calico Solar development maintain historic flows. Any increases in flows or sediment to the railroad drainage could result in overtopping of the railroad tracks. Therefore the BNSF Railway Company requires more substantial analysis for the hydrology of the proposed development to demonstrate that the construction of 24,000 sun catcher, miles of maintenance roads, a 90 acre substation and the associated construction disturbance to the desert top soils will not change the existing drainage to the railroad structures.

I swear under penalty of perjury that this testimony is true and correct to the best of my knowledge and belief.

Dated: September 17, 2010

A handwritten signature in black ink, appearing to read 'David Miller', is written over a horizontal line.

David Miller



**BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT  
COMMISSION OF THE STATE OF CALIFORNIA  
1516 NINTH STREET, SACRAMENTO, CA 95814  
1-800-822-6228 – WWW.ENERGY.CA.GOV**

**APPLICATION FOR CERTIFICATION**

***For the CALICO SOLAR (Formerly SES Solar One)***

**Docket No. 08-AFC-13**

**PROOF OF SERVICE  
(Revised 8/9/10)**

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### DECLARATION OF SERVICE

I, Ani Seferyan, declare that on October 25, 2010, I served and filed copies of the attached "Attachment N - Exhibit 1213" dated October 25, 2010. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [\[www.energy.ca.gov/sitingcases/solarone\]](http://www.energy.ca.gov/sitingcases/solarone).

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- ☐ by delivering on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses **NOT** marked "email preferred."

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- ☒ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (*preferred method*);

**OR**

- ☐ depositing in the mail an original and 12 paper copies, as follows:

#### **CALIFORNIA ENERGY COMMISSION**

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1516 Ninth Street, MS-4  
Sacramento, CA 95814-5512  
[docket@energy.state.ca.us](mailto:docket@energy.state.ca.us)

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

\_\_\_\_\_  
/s/ Ani Seferyan  
Ani Seferyan